PROCESSING POMEGRANATE JUICE WITH PECTINASE FERMENT AGAINST COLLOIDAL TURBIDITY TECHNOLOGY

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ТЕХНОЛОГИЯ ОБРАБОТКИ ФЕРМЕНТОМ ПЕКТИНАЗОЙ ПРОТИВ ОСВЕТЛЕНИЯ ГРАНАТОВОГО СОКА

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ABSTRACT

Through our article, we are now giving information on how to increase the clarity of the juice by processing it with pectinase ferment against natural colloidal turbidity in juices. Pectinases are one of the important and inexpensive enzymes of the industrial sector, especially in the fruit juice industry, which is an excellent enzyme that helps to clear and stabilize juices with high yields. Since pectinases are produced in the process of natural ripening of fruits, we also chose this enzyme for our experiment.

АННОТАЦИЯ

В нашей статье мы сейчас даем информацию о том, как повысить прозрачность сока путем обработки его пектиназной закваской против естественной коллоидной мути в соках. Пектиназы являются одними из важных и недорогих ферментов в промышленности, особенно в производстве фруктовых соков, которые являются отличным ферментом, помогающим очищать и стабилизировать соки с высоким выходом. Поскольку пектиназы вырабатываются в процессе естественного созревания плодов, мы также выбрали этот фермент для нашего эксперимента.

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Keywords: pomegranate juice, colloidal, pectinase fermenti, sentiraphu, bringing to the pulp state, splitting, incubation process, filtration, extraction.

Ключевые слова: гранатовый сок, коллоидный, пектиназные ферменты, сэнтирафу, доведение до состояния мезги, расщепление, инкубационный процесс, фильтрация, экстракция.

In order to fully assess, characterize and compile the quality indicators of fruit juice according to standard requirements - normative tables, normative documents for goods, equipment, research methods, materials, reagents and equipment were used. We used pomegranate juice to conduct a lab. With the help of normative documents, the exact amount of materials and reagents needed to assess the quality of pomegranate juice was determined.

Methods of stabilization of pomegranate juice

Stabilization against metal turbidity this is mainly of a cauterizing nature; at all stages of the production of pomegranate juice, measures should be taken to prevent the connection of pomegranate juice with the metal surface. If the amount of heavy metals is excessive in pomegranate juice, trilon B, by processing with citric acid, it is necessary to reduce the amount of metal.

When stabilizing against galloid turbidity, it is necessary to avoid excessive saturation of pomegranate juice with proteins, polysaccharides and heavy metals, as much as possible. On the basis of optional measures, we okleykalayka pomegranate juice with the help of gelatin, fish clays and bentonite substances. And in radical measures, we treat pomegranate juice with enzyme preparations.

On the basis of experiments, we developed a technology of treatment with pectinase ferment against colloidal turbidity in pomegranate juice

Ferments are one of the important tools in the modern food industry, they simplify many intermediate processes during the processing of food. The main part of industrial enzymes belongs to different groups. The most important group of nutrients from them are pectinases, which are used in the fruit and vegetable processing industry. For the first time, pectinase was used in 1930 year for the preparation of wine and fruit juices (Oslen, 2000). Pectinases are one of the most important and inexpensive enzymes of the industrial sector, especially in the fruit juice industry, which is an excellent enzyme that helps to clear and stabilize juices with high yields. Pectinases have a high molecular weight, and charged acidic glycoside macromolecules convert complex polysaccharides in plant tissues into simple molecules with extraordinary specificity, that is, catalytic strengthen. Pectinases are produced in the process of natural ripening of fruits. It decomposes polygalacturonic acid into monogalacturonic acid by opening glycoside bonds. The softening of the cell wall and the increase in the yield of juice extract from fruits are carried out during this process. Fungal pectinases are mainly extracellular, they are polygalacturonase. Pectinase Aspergillus sp is produced by several fungi. These are important in improving the properties of pectinases, commercializing industrial production and the application of these enzymes in various potential areas. Pectinases are gaining global attention as biological catalysts in many industrial processes. These elements are used in the processing of agricultural and agro-industrial waste. In many processes, such as the production of fruit juices, clarification, increasing the stability of juices and nectars, the production of high-density fruit juices and concentrates, the purification of juice is also used pectinase enzyme. As a result, today pectinases are becoming one of the promising enzymes of the trade sector. With pectinase ferment, fruit pulp is also processed. With the addition of pectinases, the viscosity of the fruit juice decreases, the pressing of the pulp improves, the jelly structure breaks down, and the fruit juice is easily obtained with high yields.

We buy fully ripe pomegranate fruit from the local market without any visual defects. The berries were washed and rinsed with running water, only the outer peel was removed and grinded using a laboratory mixer for 2-3 minutes to obtain a homogeneous fruit concentrate. Then the seeds were separated from the pulp.

To inactivate the natural enzymes of the extracted pomegranate juice, we pasteurize it at 85ºC for 3 minutes and then cool it to 40ºC. To increase the yield and clarity of fruit juice, the experience of enzymatic processing optimization with 20 g pulp, each experiment is conducted at a constant 20ºC temperature (2, 2.5, 3, 3.5 mg / 20g pulp) at a concentration of different ferments, variable incubation time (30, 60, 90, 120 and 160 minutes). After the end of enzymatic processing, in a water bath, heat the juice to a temperature of 90ºC for 5 minutes, the enzyme in the sample is inactivated.

Determination of the recovery and acidity of the juice clarity

The juices separated from the pectinase-treated pomegranate pulp are centrifuged at a speed of 2,000 rpm for 10 minutes and the natural substances are collected. The muslin is spread on a glass funnel, filtered through a cloth and the juice is collected as a clear juice. Juice yield is estimated as a percentage of the initial pulp yield. Juice yield is then calculated according to the following formula:

$$\text{Juice yield \%} = \frac{\text{The weight of fresh juice}}{\text{Sample weight}} \times 100$$

Evaluation of the clarity of juice

With the help of a spectrophotometer, the sharpness of the juice was determined by measuring the conductivity in % at a wavelength of 660 nm. Distilled water was used as a blank. We looked at the percentage transmittance as a measure of the clarity of the juice and calculated all the values of each variable, the standard error of the means using a computer program; tickling statistical analysis of all experimental data using Microsoft Excel.

Through tables 1 and 2, we can see that the entlarents increased the recovery of the juice with increased concentration and incubation time. The profitability of pomegranate juice was significantly higher with pectinase concentration and increased incubation time. The results showed a significantly higher yield of pomegranate juice (180 and 3,5%) using 20 mg / 59,74 g pulp concentrate for 74 minutes of incubation.

Table 1.

Optimize the concentration of ferments in pomegranate juice and the incubation time. Rate of recovery (dressing) (%w / w)

Enzyme concentration mg / 20g pulp	Duration of treatment with industrial pectinase, minutes /%				
	30	**60**	**90**	**120**	**180**
2.0	70.5	69.5	70	70.5	71
2.5	70	71.5	71.5	72	72
3.0	71.5	72	72	73.5	73.5
3.5	72	72.5	72.5	74.5	74.5

Table 2.

Optimization of enzyme concentration and incubation time in pomegranate juice Clarity (% T)

Enzyme concentration mg / 20g pulp	Duration of treatment with industrial pectinase, minutes /%				
	30	**60**	**90**	**120**	**180**
2.0	3.3	3.6	3.6	3.8	4.0
2.5	3.7	3.7	3.8	4.1	4.3
3.0	3.9	3.9	4.2	4.3	4.3
3.5	3.9	4.2	4.4	4.7	4.7

Conclusion

From the results, it is possible to know that with an increase in the incubation time of 20-3.5 mg of pulp in 120-180 minutes 400 C for 12 grams of pulp, it was observed that the yield of the juice increased, as well as the juice treated with the enzyme was more pronounced. Due to the fact that the cleavage of pectin led to a decrease in the ability to retain water, the yield of juice in processing with ferments increased, so that free water was separated into the system, and the sharpness was due to the expanding of the connection between the enzyme and the substrate. Thus, through this study, we have achieved economic efficiency while increasing the profitability and clarity of juice during pectinase treatment in pomegranate juice industry. It should also be taken into account that pectinase ferment is isolated from secondary raw materials of natural products in the industry.

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