TECHNOLOGY OF ENZYME TREATMENT FOR COLLOID FLUIDING IN FRUIT JUICES

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Abstract: Objective. Our article provides information on how to increase the clarity of juice by treating it with pectinase enzyme against clouding with medical colloid. Pectinases are one of the important and inexpensive enzymes of the industrial sector, especially in the fruit juice industry, they are an important enzyme for clarifying and stabilizing juices with high yields. Because pectinases are produced during the natural ripening process of fruits, we chose this enzyme for our experiment.

Key words: pomegranate juice, colloid, pectinase enzyme, centrifugation, pulping, splitting, incubation process, filtration, extraction.

Methods. In order to fully evaluate, describe and compile the quality indicators of fruit juice in accordance with the standard requirements - a normative table, regulatory documents for goods, equipment, research methods, materials, reagents and equipment were used. Laboratory transfer for pomegranate from the juice we used Normative documents using pomegranate of juice quality evaluation for necessary has been materials and of reactants sure quantity was determined .

Causes of Colloidal Bluring

Colloidal haze is a common problem in fruit juice or fruit-based products, affecting the appearance and quality of the product. This phenomenon occurs as a result of physical processes in the fruit and in the fruit. The main source of colloidal haze in fruits is the mutual adhesion of components, pectins and other organic compounds. For example, pectins, which are present in the cells of the fruit, can form water-insoluble particles during juice production. These particles remain in suspension in the juice, causing haze. Polyphenols are formed during the oxidation process. In addition, the acidity (pH level) of the fruit and temperature also affect colloidal haze. At low pH levels, coagulation is possible, which increases haze. Temperature itself, for example, heating the juice or feeding, destroys the immunity of colloidal particles. , packaging materials added to the fruit juice or impurities in the manufacturing process can also produce turbidity. For rapid turbidity determination, filtration, centrifugation, or the

use of special media (e.g., bentonite) are used. These methods help to remove colloidal particles.

Pomegranate juice stabilization methods

Stabilization against metallic fouling is mainly of a cautionary nature; At all stages of pomegranate juice production, measures should be taken to prevent pomegranate juice from coming into contact with metal surfaces. If the amount of heavy metals in the pomegranate juice is excessive, work with trilon B, citric acid to give through , it is necessary to reduce the amount of metal.

Kalloid anti-fogging stabilizer hda possibility level, it is necessary to prevent excessive saturation of pomegranate juice with proteins , polysaccharides and heavy metals . Optional ingredients are gelatin, fish clay and bentonite based on pomegranate juice We use glue . In radical measures , pomegranate juice is treated with enzyme preparations we give

Experiments based on us pomegranate We have developed the technology of pectinase enzyme treatment against colloid clouding in juice .

Enzymes are one of the important tools in the modern food industry, they simplify many intermediate processes during food processing. The main part of industrial enzymes belongs to different groups. Among them, the most important group of enzymes are pectinases used in the fruit and vegetable processing industry. Pectinase was first used to make wine and fruit juices in 1930 (Oslen, 2000). Pectinases are one of the important and inexpensive enzymes of the industrial sector, especially in the fruit juice industry, they are an important enzyme for clarifying and stabilizing juices with high yields. Pectinases are high molecular weight, charged acidic glycoside macromolecules that convert complex polysaccharides in plant tissues into simple molecules with extraordinary specificity, that is, catalytic power. Pectinases are produced during the natural ripening process of fruits. It splits polygalacturonic acid into monogalacturonic acid by opening glycosidic bonds. Cell wall softening and increased yield of juice extract from fruits i this during the process. Fungal pectinases are mainly extractive enzymes and are polygalacturonase. Pectinase is produced by several fungi, Aspergillus sp. These are important for improving the properties of pectinases, commercializing industrial production and applying these enzymes in various potential fields. Pectinases are attracting global attention as biological catalysts in many industrial processes. These enzymes are also used in the processing of agricultural and agro-industrial wastes. Pectinase enzyme is also used in many processes, such as production of fruit juices, clarification, increasing the stability of juices and nectars, production of high-density fruit juices and concentrates, and juice purification. As a result, today pectinases are one of the promising enzymes of the

commercial sector being is coming Fruit pulps are also processed with pectinase enzyme. 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 extracted with a high yield.

Fully ripened pomegranate fruits (Punica granatum L.), free from any visible external defects, were procured from a local market to ensure optimal quality and uniformity. The fruits were thoroughly washed under running tap water to remove surface contaminants, followed by careful manual removal of the outer peel (exocarp). The whole fruits, including arils and seeds, were then processed in a laboratory-grade blender for 2–3 minutes until a homogeneous fruit concentrate was obtained. Subsequently, the seeds were separated from the pulp using a fine mesh sieve, yielding fresh pomegranate pulp rich in juice.

To inactivate native enzymes and prevent undesirable biochemical reactions, the extracted pomegranate juice was subjected to thermal pasteurization at 85°C for 3 minutes, after which it was rapidly cooled to 40°C in an ice-water bath.

An enzymatic treatment optimization study was conducted to maximize juice yield and improve clarity. For each trial, 20 g of pomegranate pulp was treated with a commercial pectinase enzyme at concentrations of 2.0, 2.5, 3.0, and 3.5 mg per 20 g of pulp. Incubation was carried out at a constant temperature of 50°C for varying durations: 30, 60, 90, 120, and 160 minutes. Following enzymatic hydrolysis, the enzyme was inactivated by heating the samples in a water bath at 90°C for 5 minutes. The resulting juice was then evaluated for yield, clarity, and physicochemical properties.

Juice your clarity recovery and determination of productivity

The juices extracted from the pectinase-treated pomegranate pulp were centrifuged at 2000 rpm for 10 minutes and the supernatants were collected. The juice was filtered through a muslin cloth spread over a glass funnel and the juice was collected as a clear juice . The yield of juice is estimated as a percentage of the state obtained on the basis of the initial pulp. Then the yield of juice is calculated according to the following formula:

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

Methods.

Juice clarity was determined by measuring % transmittance at a wavelength of 660 nm using a spectrophotometer. Distilled water was used as a blank. We considered percent transmittance as a measure of juice clarity and calculated all values, standard

errors of means, of each variable using computer software; All experimental data were statistically analyzed using Microsoft Excel.

1 and Table 2 _ through , the concentration of enzymes and juice recovery with increasing incubation time increased ini let's see can _ The yield of pomegranate juice was significantly higher with increasing pectinase concentration and incubation time. The results showed a significantly higher yield of pomegranate juice (59.74 and 74.5%) using a concentration of 3.5 mg/20 g of pulp for incubation for 180 min.

Results.

Optimization of enzyme concentration and incubation time in pomegranate juice. Recovery rate (yield) (% w / w).

Table 1

Enzyme concentration mg/ 20 g pulp	Industry pectinase with processing to give duration , 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

Pomegranate in the juice enzymes concentration and incubation the time optimization Clarity (% T).

Table 2

Enzyme concentration mg/ 20g pulp	Industry pectinase with processing to give duration , 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.

Above from the presented results it can be known that with the increase of incubation time of 3-3.5 mg of enzymes for 20 grams of pulp and 120-180 minutes at a temperature of 400 C , it was observed that the yield of juice increased, and the juice treated with enzymes became more clear. Due to the fact that the decomposition of

pectin led to a decrease in the water-holding capacity, the juice yield increased during enzyme treatment, so free water was released into the system, and the clarity is due to the expansion of the contact between the enzyme and the substrate. Thus, through this study, we have achieved cost-effectiveness in industrial pomegranate juice treatment with pectinase enzyme while increasing juice yield and clarity. It should also be taken into account that pectinase enzyme is extracted from secondary raw materials of natural products in industry.

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