FE005

Osmotic techniques Application for quality development of dry lemon candy

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Abstract

The objective of this research was to choose the best technique for quality development to produce dried lemon candy. The candy was dipped into syrup of 65 degree Brix solution.The Lemon was separated for 3 different process's.T he first lemon was dipped in syrup solution of 65 degree Brix for 96 hours without glycerol, The seconds lemon was dipped in same solution as process After 96 hours the next lemon was dipped in 20% glycerol, And then the lemon was dipped into a different initial content syrup that of 15 degree Brix for 24 hours, 30 degree Brix for 5 hours, 45 degree Brix for 24 hours, 55 degree Brix for 24 hour and 65 degree Brix for 5 hours.When osmotic process was complete , lemon was measured pH, Total soluble solids before lemon was taken to drying process. In drying process lemon was put in hot air oven at 60°C around 9 hours and measured water activity. The best Osmotic process was the increasing step Osmotic solution with glycerol to determine by the highest average total soluble solids was 54.63 degree Brix and the best shelf-life was determined by the average lowest water activity was 0.492 of lemon non step content syrup with 20% glycerol.

Keywords: lemon, osmotic, glycerol.

1. Introduction

Nowadays, Food processing is the most popular for food export industry not only extending shelf – life but also increasing the cost of the product because a taste has changed. Dried lemon candy is one of favorite food industrys, but a processing to produce for preservation has a long time it not enough to consume and cannot control the quality on demand such as colour, taste, texture and use a long time for osmotic solution diffuse to lemon when after drying process the texture is not accepted from a customer.

The oblective of this reseach is to study osmotic in 3 differrent syrup the first one is high content sucrose syrup without glycerol, the second is high content sucrose syrup with 20% glycerol ,finally the initial content was low step and increased high content, Measured quality indicators after osmotic and drying processing are total soluble solids, pH, water activity.

2. Materials and Methods

2.1 Lemon.

Lemon (citrus limon) was purchased in Saraburi, Slice 8 mm and freezing at –18°C around 24 hour.

2.2 Osmotic solution.

The syrup was prepared by 3 methods, 65 degree Brix content of sucrose syrup without glycerol, 65 degree Brix content of sucrose syrup with 20% glycerol and initial content at 15 degree Brix (then increasing step by step is 30,45,55 and 65 degree Brix) within 20% glycerol.

2.3 Osmotic dehydration experiments.

Take lemon into 3 syrup were prepared time to use for the osmotic process are 96 hour for high initial content and 24 hours for low initial content then changed step 5 hours shown table 2.1.

Table 2.1

syrup content	glycerol	time (hour)
1.65°Brix	-	96
2.65 °Brix	20%	96
3.15 °Brix	-	24
- 30 °Brix	-	5
- 45 °Brix	-	24
- 55 °Brix	-	24
- 65 °Brix	20%	5

2.4 Analytical quality after Osmotic.

2.4.1 pH.

Take a lemon over after the osmotic to mixed by blender (PROBLENDER 4, PHILLIP, CHIANA) and squeeze of obtained liquid measured by pH meter (Lab 855, SI Analystic, Germany).

2.4.2 Total soluble solids.

Take a lemon over after the osmotic to mixed by blender (PROBLENDER 4, PHILLIP, CHIANA) and squeeze of obtained liquid measured by refractometer (HI 96800, HANNA, ROMANIA).

2.5 Drying process.

Lemon was taken into hot air oven (ULM 500, Hemmert, Germany) at 60°C for 8 hours.

2.6 Determination of water activity.

Water activity was measured by water activity (CH 8853, Novasina, Switzweland).

3. Results and discussion

Decide total soluble solid of Osmotic processing step by step with 20% glycerol. It had average total soluble solid 54.63°Brix, lemon of non-step Osmotic processing with 20% glycerol had 38.96°Brix and lemon of non step without glycerol had 44°Brix shown figure.1 total soluble solid of each treatment.

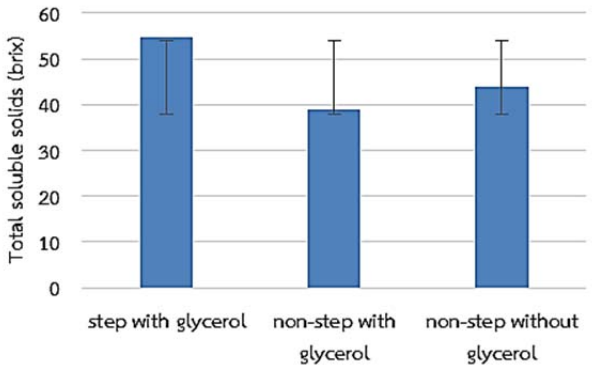

Figure.1 Total soluble solids of each treatment.

Determination average pH lemon of Osmotic processing step by step with 20% glycerol has 2.97, lemon of non-step with 20% glycerol had 2.83 and 2.67 for lemon non-step osmotic without glycerol.

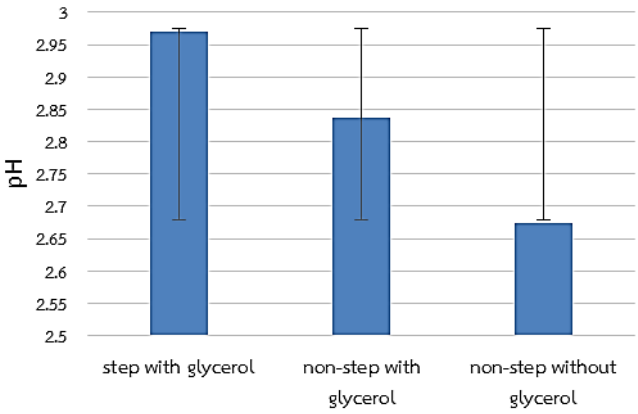

Figure 2 pH of each treatment

Water activity within 20% glycerol for non-step osmotic processing and step by step osmotic processing have lower water activity than lemon without glycerol due to glycerol was Humactants, that heolp to water activity but has remain soft texture which different from lemon without glycerol show table 1, lemon step by step and non-step osmotic processing were 0.533 and 0.492 that different from water activity of lemon without glycerol was 0.697 which was semi-dried food not dried food same lemon with glycerol.

Table 1 water activity of each treatment.

Treatment	1	2	3	a.v.	s.d.
Step +glycerol	0.527	0.540	0.534	0.534	0.007
non- step +glycerol	0.492	0.507	0.478	0.492	0.045
non-step	0.702	0.692	0.698	0.697	0.005

4. Conclusion

Determination 3 osmotic techniques total soluble solids for step by step osmotic techniques is the highest**.** Next is non-step osmotic process without.

out glycerol and finally non step with glycerol so the high content syrup in the primary time it is very fast osmotic process but when its near equilibrium that would be slow process and then lemon was pulsed osmotic step by step its always diffuse osmotic solution into lemon that better than another technique.

From figure.3.2 lemon of osmotic process step by step with glycerol was the highest average pH 2.97 next lemon non step osmotic process with glycerol had average pH was 2.83 and finally was lemon non step without glycerol average pH was 2.67 due to lemon before osmotic process it was very acid pH very low but when osmotic process syrup was diffuse into lemon so total soluble solids would be increasing.

Water activity of lemon with 20% glycerol its is the lower water activity than lemon without glycerol due to humectants that help to decrease water activity but still a soft texture different from the water activity of lemon with glycerol 0.533 and 0.492 were dried food but lemon without glycerol 0.697 was semi-dried lemon candy.

5. Acknowledgements

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