

TECHNICAL REPORT

Shelf-Life Study

Product	Refrigerated Pasteurized Whole Orange Juice.
Stabilizing Agent	CareSTAB-035

Introduction:

The whole orange juice is pasteurized, cold bottled (frozen), packed in HDPE bottles and later sold under refrigeration.

The application of the natural antioxidant CARESTAB-035 aims to increase the Shelf Life of this product, which is currently two weeks, while maintaining its sensory quality for a longer time.

Goals:

Evaluate the performance of the product, packed in 11/07/2013, applied 0.03% (300 ppm) CARESTAB-035 (Test) compared to the standards (control) during shelf life.

Results:

- Physicochemical Analysis

Control	pH	Brix (°Brix)	Acidity (%)	Ratio
Week 1	3,94	12,0	0,78	15,4
Week 2	3,93	11,9	0,80	14,9
Week 3	3,91	11,9	0,78	15,3
Week 4	3,86	11,9	0,78	15,3
Week 5	3,87	12,0	0,78	15,4
Week 6	3,83	11,9	0,78	15,3
Week 7	3,72	11,9	0,79	15,1
Week 8	3,80	11,8	0,77	15,3

Test	pH	Brix (°Brix)	Acidity (%)	Ratio
Week 1	3,93	12,2	0,74	16,5
Week 2	3,92	12,1	0,75	16,1
Week 3	3,94	12,2	0,73	16,7
Week 4	3,86	12,1	0,72	16,8
Week 5	3,91	12,2	0,73	16,7
Week 6	3,85	12,2	0,74	16,5
Week 7	3,73	12,1	0,73	16,6
Week 8	3,87	12,0	0,71	16,9

Sensory Evaluation

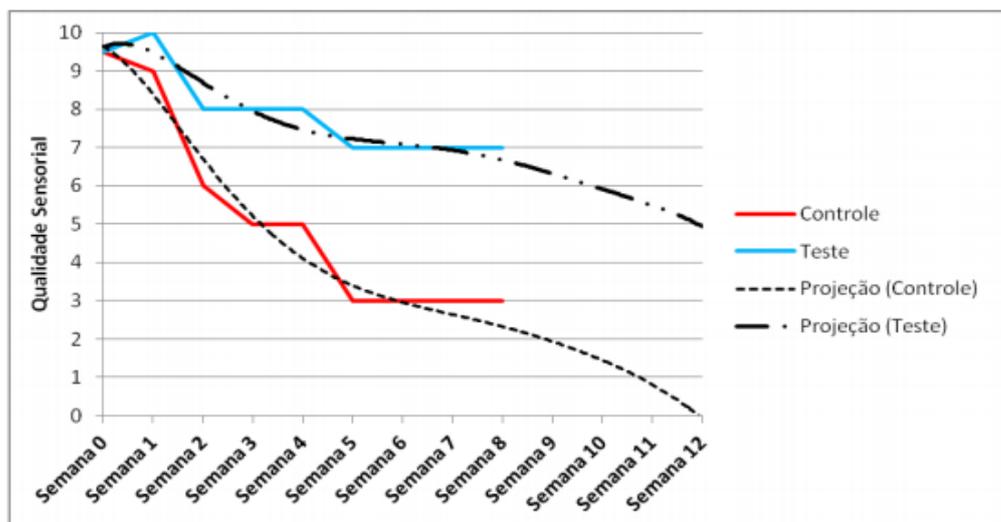
The samples were evaluated on the sensory aspects of their flavor, color and odor along 8 weeks of evaluation (Attachments). It was used the hedonic scale of 0 to 10 to assign sensorial quality scores to the samples. It was considered that its score shouldn't be less than 5 in order to be sensory acceptable.

The following chart presents the behavior of the sensory quality scores along the shelf-life. There is an inclination of quality loss for both samples, however, this loss is much more significant for the control sample than for the test sample.

The dashed lines show a theoretical projection of the shelf-life after 8 weeks, according to the results obtained in the previous reviews.

According to these projections, the Test sample will still be sensory accepted by the eighth week, but the Control sample will present a much lower sensory quality score, being rejected sensory.

(CHART)



SENSORY QUALITY GRAPHIC

CAPTION: Control Sample
Test Sample
Projection (Control Sample)
Projection (Test Sample)

Final Results:

The application of 0.03% of the CARESTAB-035 in pasteurized whole orange juice packaged and refrigerated HDPE bottles, sold under refrigeration, the shelf-life of this product has the possibility of being extended from 2 to 10-12 weeks, ensuring it the desirable taste characteristics, color and odor of the product.

**Attaches:
CONTROL SAMPLE**

	<i>Week</i>	<i>Sensory Evaluation</i>	<i>Score</i>
Control Sample	Week 1	Bitter taste due to an essential oil overdose. Color and odor characteristic from Fresh orange juice.	9
	Week 2	Moderate spoiled orange flavor due to essential oil and vitamin C moderate oxidation. Color and odor characteristic from Fresh orange juice, but moderate loss of the fresh orange odor.	6
	Week 3	Accentuated spoiled orange flavor due to essential oil and vitamin C oxidation. Color and odor characteristic from Fresh orange juice, but accentuated loss of the fresh orange odor. Product sensory REPROVED.	5
	Week 4	Accentuated spoiled orange flavor due to essential oil and vitamin C oxidation. Color characteristic from orange, but total loss of the fresh orange odor. Predominance of the spoiled orange odor. Product sensory REPROVED.	5
	Week 5	Strongly accentuated spoiled orange flavor due to essential oil and vitamin C oxidation, score presence of cebion. Slight loss of the fresh orange color; however total loss of the fresh orange odor. Predominance of the spoiled orange odor. Product sensory REPROVED.	3
	Week 6	Strongly accentuated spoiled orange flavor due to essential oil and vitamin C oxidation, score presence of cebion. Slight loss of the fresh orange color; however total loss of the fresh orange odor. Predominance of the spoiled orange odor. Product sensory REPROVED.	3
	Week 7	Strongly accentuated spoiled orange flavor due to essential oil and vitamin C oxidation, score presence of cebion. Slight loss of the fresh orange color; however total loss of the fresh orange odor. Predominance of spoiled orange odor. Product sensory REPROVED.	3
	Week 8	Strongly accentuated spoiled orange flavor due to essential oil and vitamin C oxidation, score presence of cebion. Slight loss of the fresh orange color; however total loss of the fresh orange odor. Predominance of the spoiled orange odor. Product sensory REPROVED.	3

TEST SAMPLE			
Test Sample	Week	Sensory Evaluation	Score
	Week 1	Slightly bitter taste due to essential oil overdose. Color and odor characteristic from fresh orange juice.	10
	Week 2	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice.	8
	Week 3	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice.	8
	Week 4	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice.	8
	Week 5	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice. Moderate presence of spoiled orange scores, with some fresh orange scores.	7
	Week 6	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice. Moderate presence of spoiled orange scores, with some fresh orange scores.	7
	Week 7	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice. Moderate presence of spoiled orange scores, with some fresh orange scores.	7
	Week 8	Taste characteristic from fresh orange juice. Slight loss of the fresh orange scores. Color and odor characteristic from fresh orange juice. Moderate presence of spoiled orange scores, with some fresh orange scores.	7

Designed by:	Cristina Cintra Cecon	Approved by:	José Alverne Albuquerque Filho Químico CRQ 004149968
--------------	-----------------------	--------------	--