Nusun Frying Stability

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Abstract: The frying stability of Nusun was compared to that of several different commercially available food service frying mediums. These different frying mediums include sunflower oil, high oleic low/linolenic canola oil, 85 IV PHSBO and 98 IV PHSBO. Used frying oil data suggested that Nusun performed very well. Roundtable sensory analysis suggested that water blanched potato cubes fried in Nusun developed better fried food flavor throughout the duration of the frying comparison.

Key Words: Nusun, frying stability.

Introduction: Nusun sunflower oil shows great potential as a foodservice and commercial frying medium. With the increased oleic acid content, decreased linoleic acid content and low saturated fatty acid content, Nusun provides to the consumer a stable frying medium with excellent nutritional qualities.

Previous work done in Spain (1) indicates that sunflower oils with similar composition to that of Nusun exhibited good thermal stability and frying performance. The purpose of this test was to determine the frying stability of Nusun compared to that of commercially available frying mediums.

Materials and Methods: Frying mediums were evaluated by using a standard frying protocol. Two different frying tests were used to evaluate Nusun. Frying protocol consisted of using 6.8 kg Star Electric Fryers. Fryers were filled with 6.8 kg of respective frying medium. Frying temperature was maintained at 175°C ±3.0°C twenty-four hours a day for eight days. On each day of the frying test, frozen water blanched diced potatoes (NORPAC Foods, Lake Oswego, OR) were deep-fried. During each frying period baskets were loaded with 230 grams of frozen potato. Frying time was four minutes. Oil samples were taken at the end of the day and frozen until analyzed. Fryers were then topped off to achieve proper frying level.

Oil samples were analyzed for free fatty acids (AOCS Ca 5a-40), para-Anisidine Value (AOCS Cd 18-90), and Hunter Color.

Results and Discussion: Frying test #1 compared Nusun to that of sunflower oil.

Table #1: Frying Test #1 – Fresh Oil Analysis

Analysis	Nusun	Sunflower
PV (Mq/Kg)	0.1	0.9
FFA (%C18:1)	0.02	0.03
IV	106.1	128
C16:0	4.9	6.0
C18:0	3.5	4.1
C18:1	55.7	27.8
C18:2	33.9	60.1
C18:3	0.5	Tr
C20:0	0.3	0.4
C22:0	--	0.7
Trans	<1.0	<1.0

Results of the analytical analysis of used oil samples from frying test #1 are contained in table #2.

Table #2: Frying Test #1 – Used Oil Analysis

Sample	FFA (%C18:1)	p-AV	Hunter DEW
F1 Fresh	0.05	3.8	43.7
F2 Fresh	0.05	2.5	43.5
F1 Day 1	0.06	19.8	46.6
F2 Day 1	0.04	26.9	47.3
F1 Day 2	0.09	45.5	49.5
F2 Day 2	0.09	56.7	53.0
F1 Day 4	0.15	57.1	53.4
F2 Day 4	0.19	75.9	59.2
F1 Day 6	0.23	64.3	57.6
F2 Day 6	0.27	71.2	61.1
F1 Day 8	0.32	61.4	60.1
F2 Day 8	0.37	66.5	63.5

F1 = Nusun, F2 = Sunflower

Frying test #2 compared Nusun to High Oleic, Low Linolenic Canola Oil. Table #3 contains the fresh oil analysis.

Table #3: Frying Test #3 – Fresh Oil Analysis

Analysis	Nusun	High Oleic / Low Linolenic Canola
PV (Mq/Kg)	0.1	0.9
FFA (%C18:1)	0.02	0.03
IV	106.1	94.4
C16:0	4.6	3.7
C18:0	3.5	2.0
C18:1	56.1	73.3
C18:2	31.6	14.2
C18:3	0.4	2.6
C20:0	1.5	0.6
Highers	1.5	3.1
Trans	<1.0	<1.0

Results of the analytical analysis of the used oil samples from frying test #2 are presented in table #4.

Table#4: Frying Test #2 – Used Oil Analysis

Sample	FFA (%C18:1)	p-AV	Hunter DEW
F1 Fresh	0.02	4.4	43.5
F2 Fresh	0.03	2.5	44.2
F1 Day 1	0.04	--	46.4
F2 Day 1	0.06	--	47.8
F1 Day 2	0.09	53.4	50.2
F2 Day 2	0.10	44.6	53.7
F1 Day 4	0.17	--	57.2
F2 Day 4	0.21	--	60.9
F1 Day 6	0.26	--	--
F2 Day 6	0.31	--	--
F1 Day 8	0.26	78.6	64.0
F2 Day 8	0.36	62.9	68.9

F1 = Nusun, F2 = High Oleic Low Linolenic Canola

Frying Test #3 compared Nusun to partially hydrogenated soybean oil samples (85 IV and 98 IV). Table #5 contains fresh oil data. Table #6 contains used frying oil data from frying test #3.

Table #5: Frying Test #3 – Fresh Oil Data

Analysis	Nusun	85 IV PHSBO	98 IV PHSBO
FFA (% C18:1)	0.04	0.03	0.03
Calculated IV	106.1	85.1	97.5
C16:0	4.6	10.0	10.9
C18:0	3.5	5.2	5.1
C18:1	57.1	32.7	26.4
Iso C18:1	-	32.4	23.1
C18:2	32.3	11.8	25.2
Iso C18:2	-	4.7	4.4
C18:3	0.4	0.2	1.4
C20:0	0.3	0.3	0.3
Highers	1.5	2.2	2.6
Trans	<1.0	23.1	18.5

Table #6: Frying Test #3 Used Oil Analysis

Sample	FFA (%C18:1)	p-AV	Hunter DEW
F1 Fresh	0.04	4.4	43.1
F2 Fresh	0.03	0.5	42.9
F3 Fresh	0.03	0.6	43.2
F1 Day 1	0.04	20.3	44.8
F2 Day 1	0.05	12.4	48.3
F3 Day 1	0.04	17.7	47.2
F1 Day 2	0.07	50.5	49.9
F2 Day 2	0.10	34.9	53.5
F3 Day 2	0.08	47.1	52.7
F1 Day 4	0.15	70.6	54.7
F2 Day 4	0.19	48.5	59.1
F3 Day 4	0.15	67.9	57.4
F1 Day 6	0.20	71.7	58.2
F2 Day 6	0.27	46.9	63.5
F3 Day 6	0.22	66.8	60.7
F1 Day 8	0.31	64.5	61.6
F2 Day 8	0.44	41.2	67.6
F3 Day 8	0.33	62.4	64.8

F1 = Nusun, F2 = 85 IV PHSBO, F3 = 98 IV PHSBO.

Laboratory frying data suggests that Nusun sunflower oil can be successfully used as a foodservice frying medium, offering good frying stability, while producing fried food products with good taste and good nutritional characteristics.

1. Dobarganes,M.C.; Marquez-Ruiz, G.;Perez-Camino, M.C. Thermal Stability and frying Performance of Genetically Modified Sunflower Seed (Helianthus annuus L.) Oils. J. Agric. Food Chemistry 1993, 41, 678-681.