

Utilization of Seabuckthorn Fruit Pulp and Juice as Functional Food Ingredients

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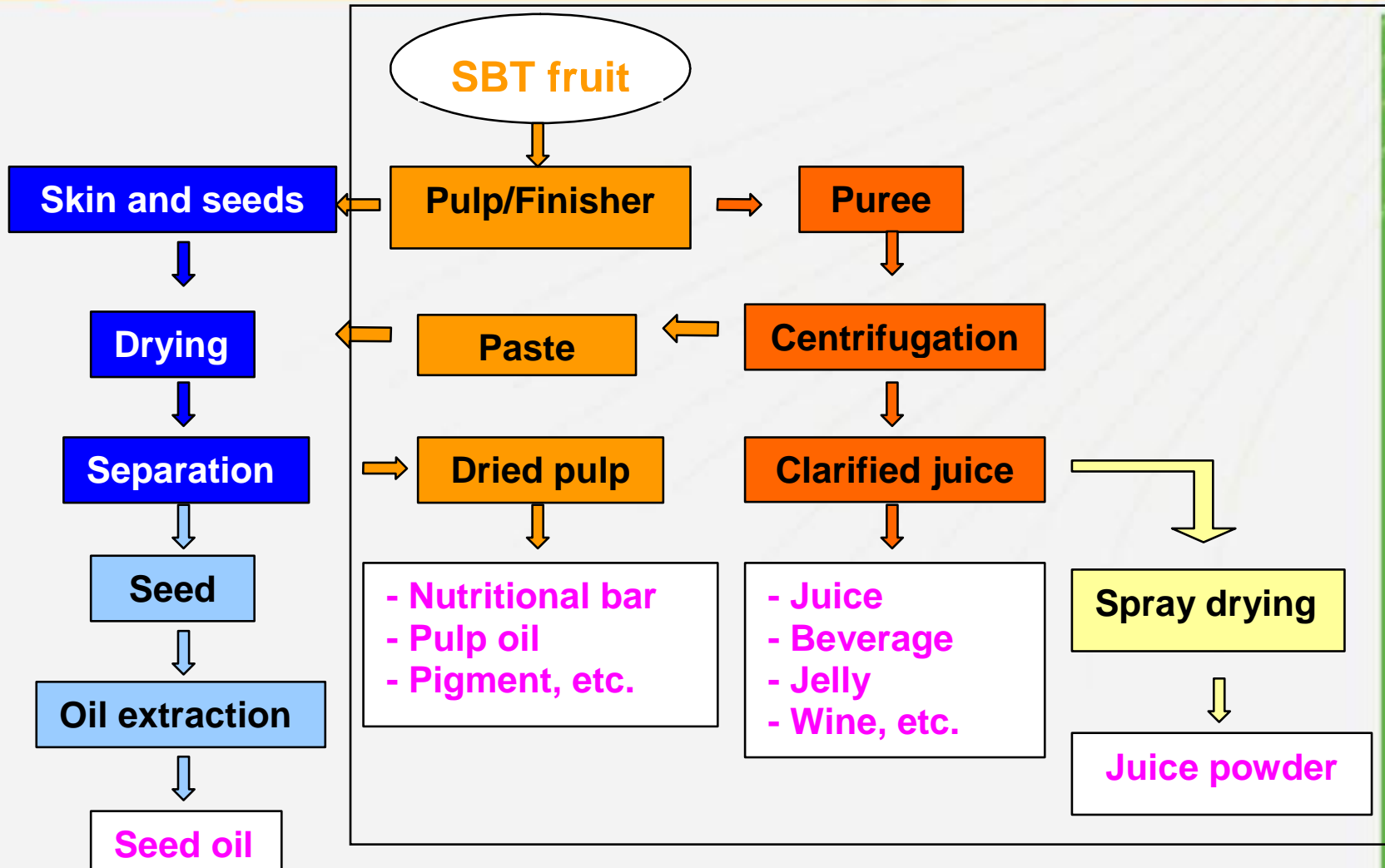
Presentation Outline

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- Seabuckthorn (SBT) processing
- Utilization of SBT juice
 - SBT beverage
 - SBT jelly
 - SBT wine
 - Spray drying SBT juice
- Utilization of SBT pulp
 - SBT nutritional bar
- Utilization of SBT fruit
 - Infused SBT fruit
- Summary

Seabuckthorn Processing

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Composition of SBT Juice

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NUTRIENT	SEABUCKTHORN VARIETY	
	INDIAN SUMMER	<i>SINENSIS</i>
Protein (g/100g)	0.6	0.6
Fat, Total (g/100g)	1.4	0.8
Saturates	0.6	0.3
Omega 6	0.1	0.1
Omega 7	0.5	0.2
Omega 9	0.2	0.2
Vitamin A (mg/100g)	636 IU	308 IU
Vitamin C (mg/100g)	187	450

Comparison of Fruit Juices

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	Seabuckthorn (<i>Sinensis</i>)	Orange	Grapefruit	Cranberry	Prune	Tomato
Energy (kcal/100g)	49	45	39	46	71	17
Protein (g/100g)	0.60	0.70	0.50	0.39	0.61	0.76
Fat (g/100g)	0.80	0.20	0.10	0.13	0.03	0.05
Carbohydrates (g/100g)	9.80	10.40	9.20	12.20	17.45	4.24
Calcium (mg/100g)	11	11	9	8	12	10
Iron (mg/100g)	1.10	0.20	0.20	0.25	1.18	0.43
Vitamin A (IU/100g)	308	200	440	45	3	450
Vitamin C (mg/100g)	450	50	38	9.3	4.1	18.3

Sources: USDA Nutrient Database for Standard Reference
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SBT Juice Sensory Attributes

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- Bright orange/red color
- Opaque with some surface oil
- Pulpy
- Very tart, fruity flavor
- Distinctive strong aroma
- Differences exist between varieties
 - Color (Indian Summer dark red orange)
 - Sweetness (Indian Summer more tart)



Beverage Formulation Considerations

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- Sweetener required for palatability
 - Apple juice concentrate
- Maximum of 30% juice for palatable beverage
- Juice is pulpy and contains oil which separates
- Minimize heating to preserve color and limit loss of heat sensitive nutrients
- Indian Summer produced a slightly more tasteful beverage



SBT Beverage Nutrition Facts

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Nutrition Facts

Valeur nutritive

Serving Size 250 mL / Portion

Servings Per Container

Portions par contenant

Amount Teneur	% Daily Value % valeur quotidienne
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Calories / Calories 240

Fat / Lipides 1 g 2 %

Saturated / saturés 0.4 g 2 %
+ Trans / trans 0 g

Cholesterol / Cholestérol 0 mg 0 %

Sodium / Sodium 15 mg 1 %

Carbohydrate / Glucides 58 g 19 %

Fibre / Fibres 0 g 0 %

Sugars / Sucres 51 g

Protein / Protéines 0.4 g

Vitamin A / Vitamine A 15 %

Vitamin C / Vitamine C 240 %

Calcium / Calcium 4 %

Iron / Fer 4 %



SBT Jelly Nutrition Facts

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Nutrition Facts

Valeur nutritive

Serving Size 1 Tablespoon (15ml)
Portion

Amount Teneur	% Daily Value % valeur quotidienne
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Calories / Calories 30

Fat / Lipides 0.1 g 0 %

Saturated / saturés 0 g 0 %
+ Trans / trans 0 g

Cholesterol / Cholestérol 0 mg 0 %

Sodium / Sodium 0 mg 0 %

Carbohydrate / Glucides 8 g 3 %

Fibre / Fibres 0 g 0 %

Sugars / Sucres 7 g

Protein / Protéines 0 g

Vitamin A / Vitamine A 2 %

Vitamin C / Vitamine C 0 %

Calcium / Calcium 0 %

Iron / Fer 0 %



Seabuckthorn Wine

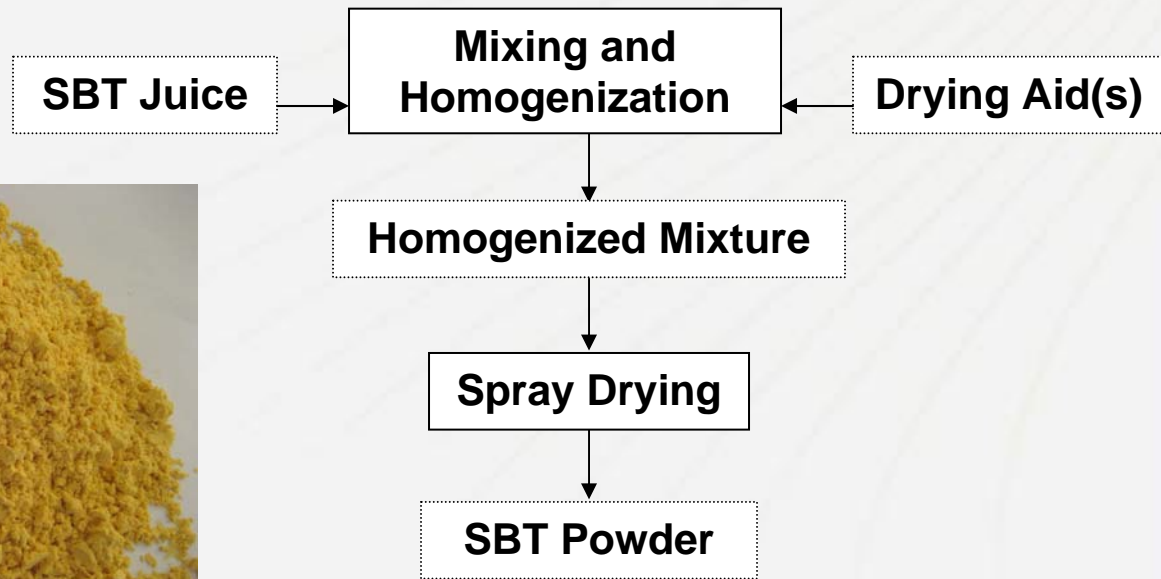
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Collaborated
research and
development
with D.D.
Leobard
Winery Inc.

Spray Dried SBT Juice

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Composition of SBT Pulp

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NUTRIENT	INDIAN SUMMER	<i>SINENSIS</i>
Protein (g/100g)	6.80	11.90
Fat (g/100g)	23.53	13.73
Saturated	8.85	4.87
Monounsaturated	11.12	6.21
Polyunsaturated	3.56	2.53
Omega 3	0.65	0.51
Omega 6	2.91	2.02
Omega 7	8.63	4.58
Fibre (g/100g)	31.00	39.60
Vitamin C (mg/100g)	442	743
Vitamin A (IU/100g)	8212	4397

Dried SBT Pulp Sensory Attributes

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- Orange color
- Strong distinctive aroma
- Very tart slightly fruity flavor
- Fibrous texture, gritty/powdery mouth feel when ground
- Differences between varieties: Indian Summer is more tart and more red



Sinensis

Indian Summer

Bar Formulation Considerations

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- Unbaked cereal bar using Indian Summer pulp
- Up to 10% dried pulp
- Flavor limits pulp usage
- SBT flavor is unfamiliar and unexpected in bars
- Must balance strong tart SBT flavor
- Pulp particle size affects appearance and texture
- SBT color masks other ingredients at high levels
- Possible humectant effect



SBT Bar Nutrition Facts

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Nutrition Facts

Valeur nutritive

Serving Size 1 Piece (30 g)

Portion (30 g)

Amount Teneur	% Daily Value % valeur quotidienne
Calories / Calories 120	
Fat / Lipides 6 g	9 %
Saturated / saturés 0.5 g	3 %
+ Trans / trans 0 g	
Polyunsaturated / polyinsaturés 3 g	
Omega-6 / oméga-6 2 g	
Omega-3 / oméga-3 1 g	
Monounsaturated / monoinsaturés 1.5 g	
Cholesterol / Cholestérol 0 mg	0 %
Sodium / Sodium 20 mg	1 %
Carbohydrate / Glucides 17 g	6 %
Fibre / Fibres 2 g	8 %
Sugars / Sucres 10 g	
Protein / Protéines 4 g	
Vitamin A / Vitamine A	4 %
Vitamin C / Vitamine C	15 %
Calcium / Calcium	2 %
Iron / Fer	8 %

Infused Fruits Formulation Considerations

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- Infused with apple juice concentrate and dried
- Contains seed oil and fibre
- Potential ingredient for bar enrichment



Sensory Properties of Infused Fruits

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- Strong aroma
- Tart fruity flavor
- Appealing orange/red color
- Chewy dried fruit texture
- Large seeds are difficult to chew (less noticeable in a bar)
- Variety differences: Indian Summer fruits are darker orange/red, more tart and the seeds are easier to chew than *sinensis*

Conclusions

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- SBT juice: very high vitamins A and C
- Pleasing beverage prepared with up to 30% juice and sweetener
- Pulp supplies fibre, omega 7 fatty acids, vitamins A & C and antioxidants
- Bars are a good use for the pulp by-product
- Flavor, texture and color limit pulp incorporation
- Add infused fruits to boost nutritional profile of bars
- Bars are a good application to use infused fruits; mask seeds

Conclusions

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- Indian Summer pulp, juice and infused fruits are darker orange/red and more tart; the seeds in the infused fruits are softer compared to *sinensis*
- Pulp contains ~1/3 fibre and is very high in vitamin A
- Indian Summer pulp contains ~25% fat, almost twice the fat of *sinensis*.
- Incorporating in bars helps mask hard seeds

Acknowledgement

GROWING Opportunities

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Thank You!
QUESTIONS?