Chemistry of Sea Buckthorn - nutritional, medicinal, and cosmetic aspects

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SBT and it's position in our view of world

different species, sub-species and varieties

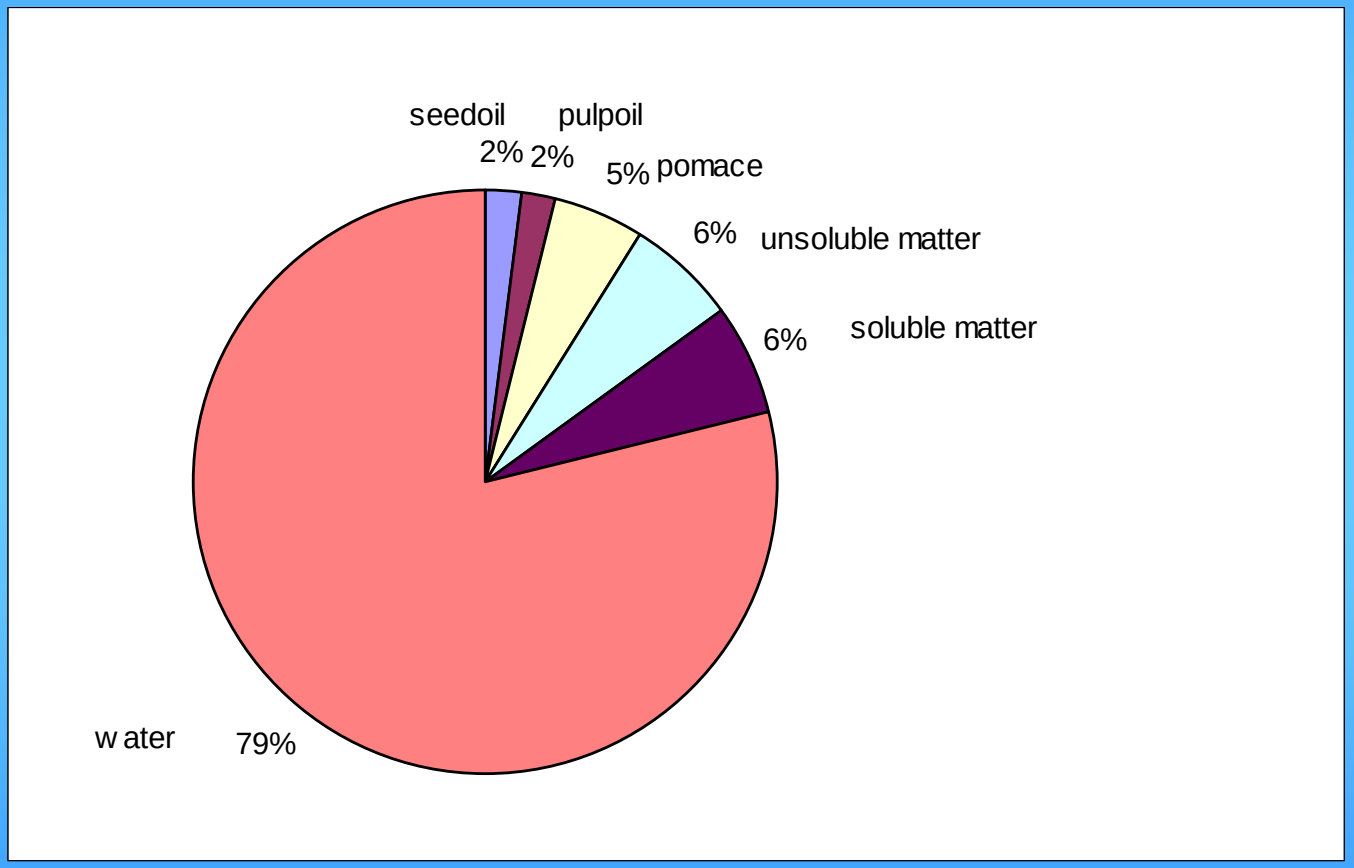
- *H. rhamnoides* L.
  - subsp. *Mongolica*
  - subsp. *rhamnoides* (L.)
  - subsp. *sinensis*
  - subsp. *turkestanica*
  - subsp. *yunnanensis*
  - (subsp. *Gyantsensis)*
- *H. salicifolia*
- *H. gyantsensis*
- *H. tibetana*
- *H. goniocarpa*
- *H. neurocarpa*

SBT and it's position in our view of world

Fields of interest

- *SBT as an ecological source*
  - stabilisation of sands in high mountains and cost regions
- *SBT for production of valuable products:*
  - fruits
  - juice
  - oil
  - feed
  - wood
  - drugs and pharmaceutical raw materials
- *SBT as an social-economic factor*
- *Use as ornamental plant and in gardening*
- *……*

Chemical composition of SBT



Chemical composition of SBT

Composition [mg/100 g]	Seabuckthorn	Wild brier	Apple	Black currant
Carotene	1,0 – 18,7	1,0 – 2,7	0,05	0,02
Ascorbis acid	260	470 – 4.700	1,4	180
Tocopheroles	3,0 – 18,0		<1,0	<1,0
Phyllochinone	0,8 – 1,28		0,3 – 0,5	0,7 – 1,25
Vitamin B	0,05 – 0,1	0,1	0,01 – 0,45	0,05 – 0,6
Niacin	50 - 250		62 – 1.370	200 - 500
Organic acids Tartaric acid	3000 – 4000	1,0 – 3,5	0,4 – 1,0	3,0 – 5,6
Pulp oil [%]	1,2 – 3,5			

Chemical composition of SBT

Additional interesting components

- polyphenolic compounds
  - flavonoids
  - bioactive compounds - hiporamin
  - in berries, pulp, leaves, wood
  - differnt amounts
- tannins
- lignanes

Chemical composition of SBT

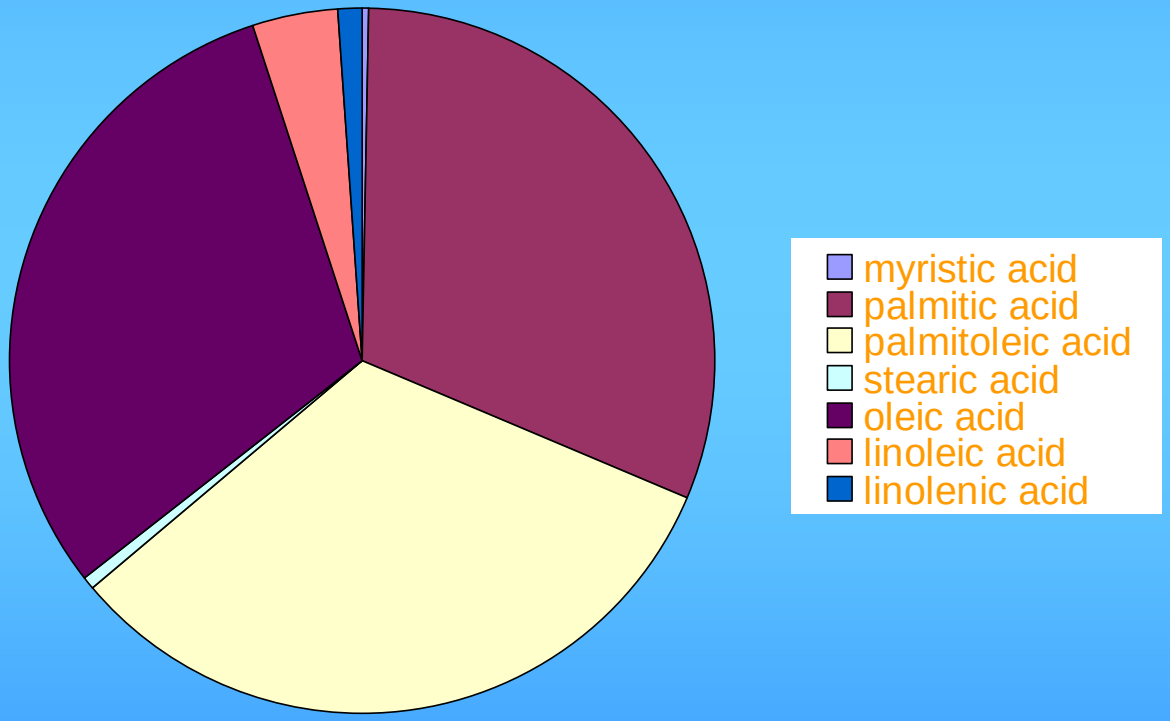
Parameter		Min	Max	Mittel	RSD
density 20 °C	g/cm³	0,85	0,94	0,8968	2,6%
Refraction index		1,464	1,472	1,4670	0,1%
unsaponifiable matter	%	1,6	3,7	2,2052	30,1%
Carotenoides	mg/100g	18,72	166,5	83,317	57,1%
β-Carotene	mg/100g	17,5	191	53,346	76,4%
Tocopheroles	mg/100g	15,7	983	150,3	158,2%
Steroles	%	0,1	0,9	0,39	49,6%

Chemical composition of SBT

Parameter		Min	Max	Mittel	RSD
moisture	%	0,02	2,3	0,496364	113,4%
ffa	mg KOH/g	0,5	24,6	8,8	76,9%
POZ	meq/kg	0	7	1,4	148,5%
Ranzimat 110°C, 20 l/h	h		65	27,5	65,7%

Chemical composition of SBT

Fatty Acid Composition [%]



SBT as raw material - areas of interest

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- Juice and products from juice
- oil and oily products
- cosmetics from oil or juice
- pharmaceuticals from SBT oil, leaves, bark
- nutraceuticals, dietary supplements
- novel food
- food additives (flavour, colorants etc.)

Application in nutrition

- largest area of interest - juice
  - vitamins, aroma compounds
  - nutritional value sugar, minerals
  - low fat, proteins
- many products from juice (jelly, desserts...)
- whole berries as dessert fruits
- seed oil as food supplement
- pulp oil as speciality oil - small market

Application in nutrition

SBT in medicine and pharmacy

SBT in medicine and pharmacy

- Antibacterial properties
  - ... against paratyphoid fever
  - ...against staphyloccoccus
  - ...against proteus
- urogynecology application for injuries and inflammatory diseases

SBT in medicine and pharmacy

- skin diseases -
  - acne
  - phlegmon
  - eczema
  - Lupus erythtemotodes
  - skin cancer
  - allergies
  - alopecia
- ophthalmic diseases
  - burning, chemical irritation
- diseases of mouth and pharynx
  - inflammation, wounds, dis. of tongue

SBT in medicine and pharmacy

- Burns and wounds
  - skin
  - frostbites
  - radiation damages
  - accelerated healing of wounds
  - minimised scarring
  - prevents inflammation
- neoplasm
  - stomach, duodenum

SBT in medicine and pharmacy

- More interesting properties
  - metabolic regulation
  - analgesic
  - SPF (sun protection effect) 2,4 ... 3,2
  - anti toxic
  - hepato-protective
  - strengthening the immune system

Cosmetics from Seabuckthorn

Cosmetics from Seabuckthorn

- Wide variety of products
- often based on medical effects
- Cremes, lotions, shower gel, body milk & ~oil
- sun protection products
- make up - colouring products

- *new ideas welcome !*

- *market with strong local influences*

Cosmetics from Seabuckthorn

- Cremes
- lotions
- shower gel
- body milk & ~oil
  - fat as preventing and nurturing component
  - vitamin E for skin repair
  - vitamin Pro-A - carotene - skin protecting agent
  - moisturising effect - hydrocolloids
  - anti-inflammatory compounds
  - vitamin D and it’s Pro-vitamins for skin care

Cosmetics from Seabuckthorn

- sun protection products
  - *carotene as protecting agent*
  - *vitamin E and D as skin care*
  - *moisturising agents, cooling effect*
  - *lipids for skin repair after sun burns*

  - *low SPF - not very efficient (2,4 - 3,2)*
    time needed to produce a sunburn on protected skin in comparison to unprotected skin.

Cosmetics from Seabuckthorn

- make up - colouring products
  - colouring effect arising from carotene
  - skin protection and care by lipids
  - anti-inflammatory effect
  - often combined with other colouring substances

  - also for lipstic
  - skin protection and care

application in border regions

application in border regions

- Raw-materials and semi-products are in upper price segment
- final products should give adequate earnings
  - nutraceuticals from SBT
    vitamins and essential food ingredients (PUFA)
  - food supplements from or with SBT
    vitamins, essential ingredients, a convincing product story
  - SBT as promoter for complex products... The same story as well
  - SBT as source for accelerated product cycle

Summary

- SBT is a plant with a great scientifiv and economic potential
- SBT products are widely found in food and cosmetics
- application in medicine is a field of historical knowledge and actual interest
- eastern and western view on health clash in this field
- variety of products will grow quickly
- market of SBT products will become international, not only for raw materials

Thanks for your kind attention