

**CO₂ 1st choice for
aroma extraction**

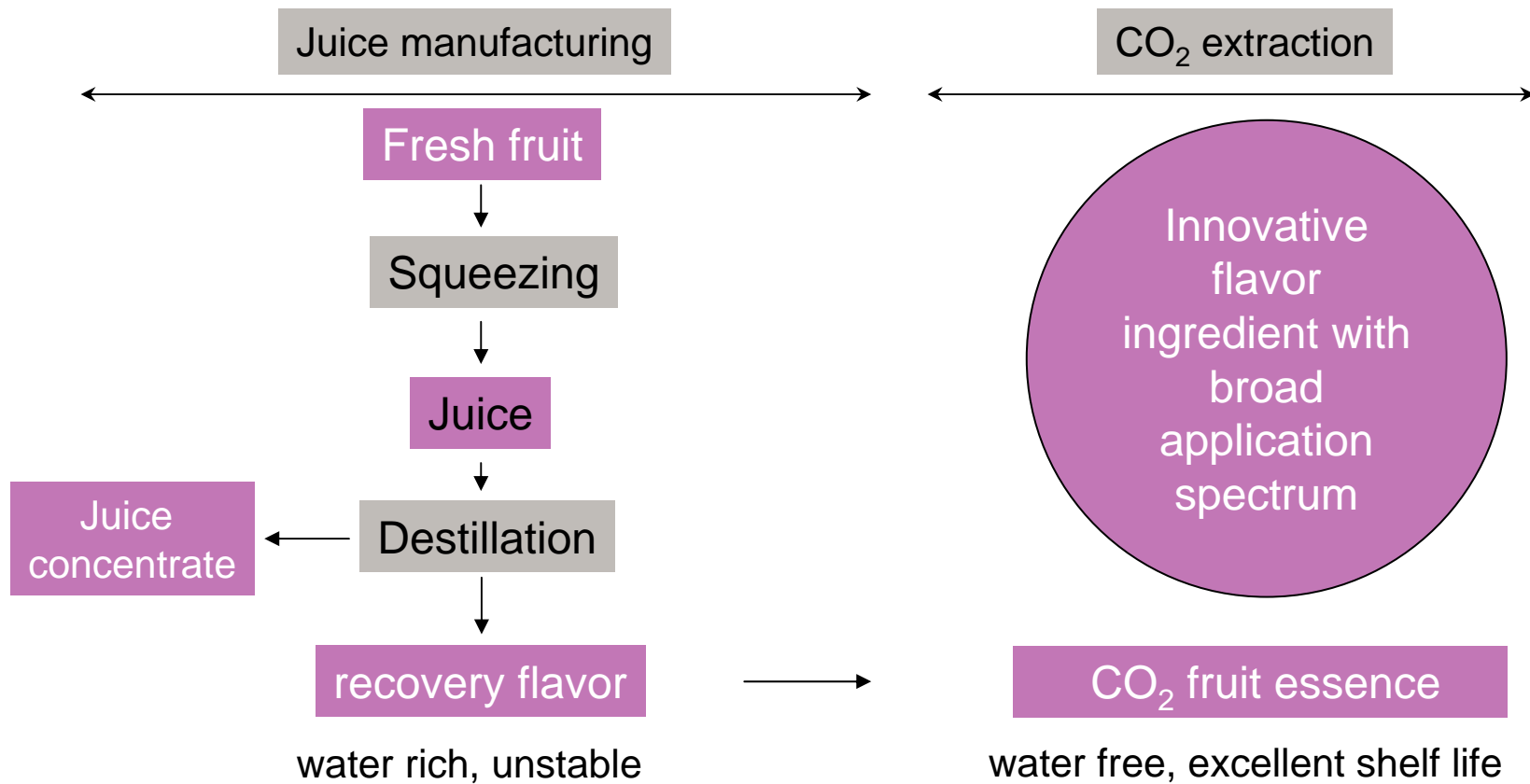


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Tailored fruit flavor extract



Obtaining water free highly concentrated fruit essences with excellent stability

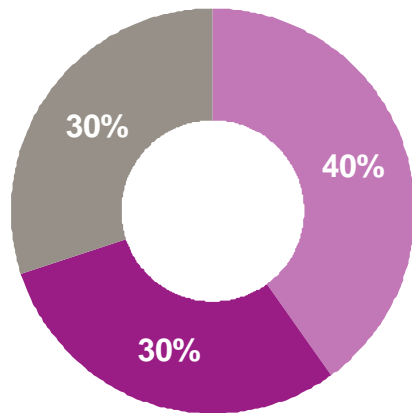


Tailored ginger extracts



Exploiting adjustable CO₂ solvent properties (pressure/temperature)

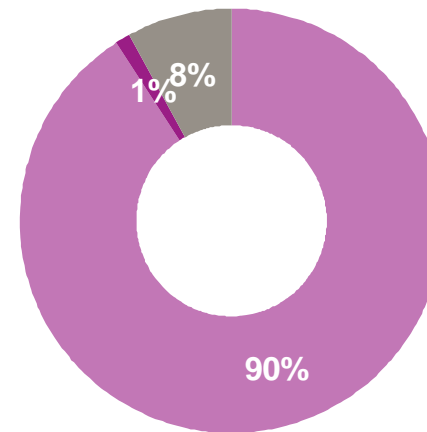
total extracts



■ Essential Oil ■ Pungent Comp. ■ Resinoid

**Oleo-resin
pungent for savory**

selective extracts



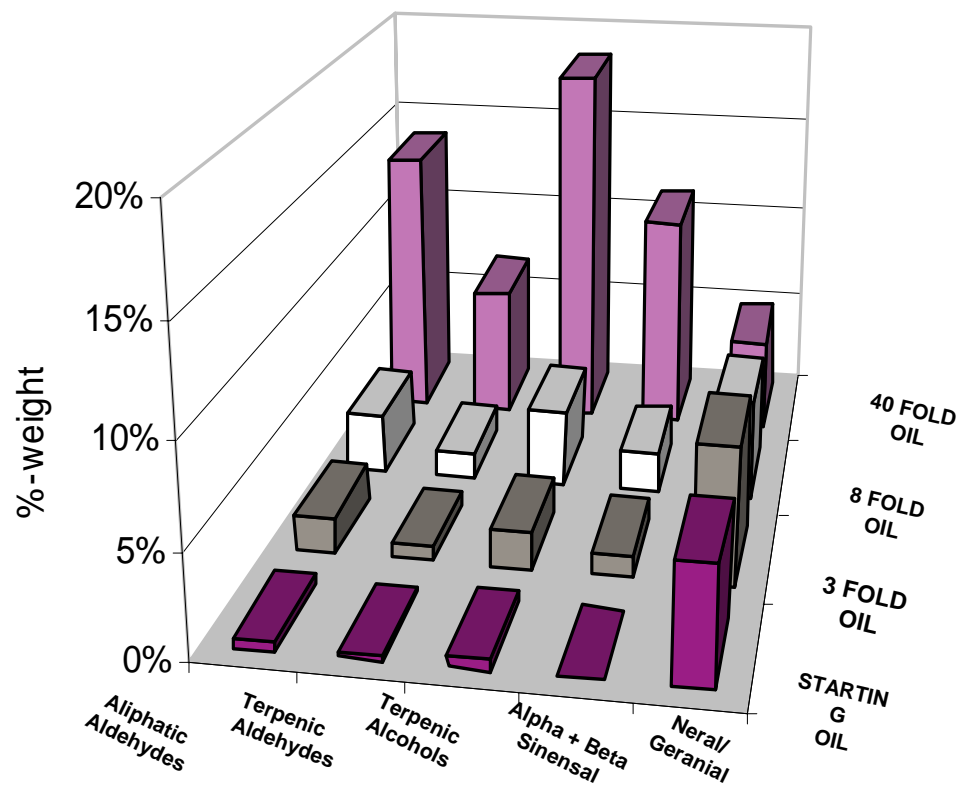
■ Essential Oil ■ Pungent Comp. ■ Resinoid

**Essential oil, mild for aroma
& fragrance applications**

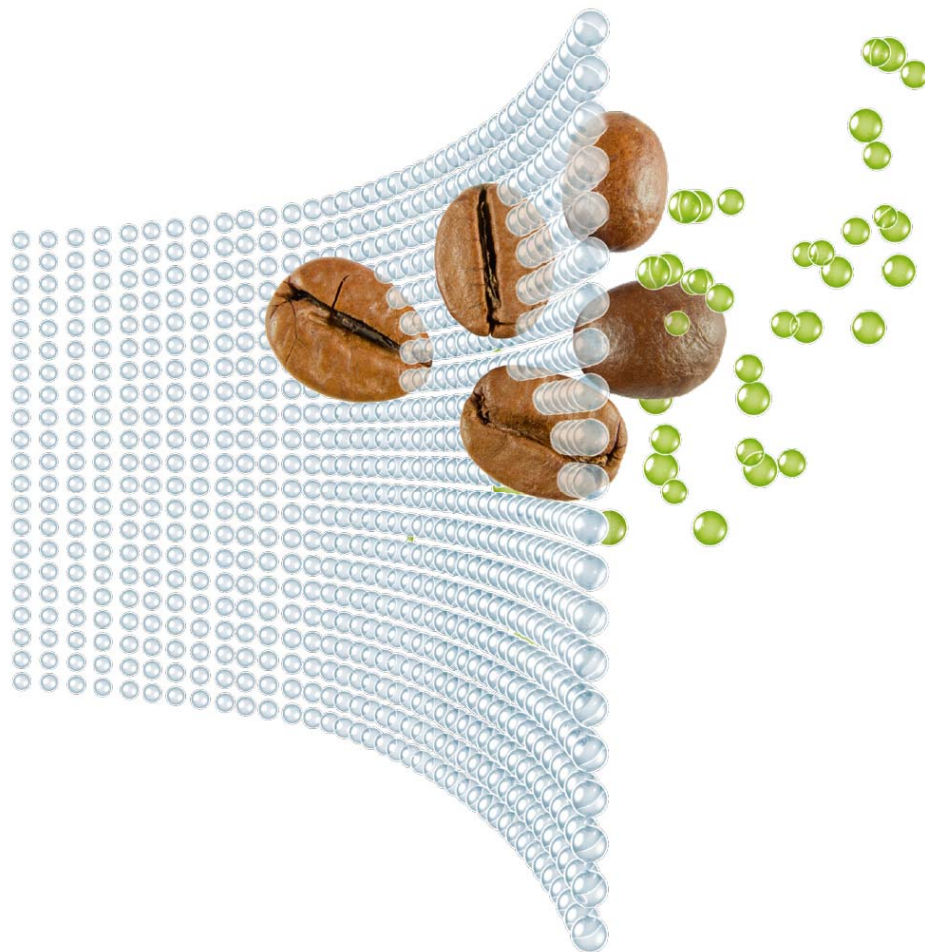
Tailored citrus oils



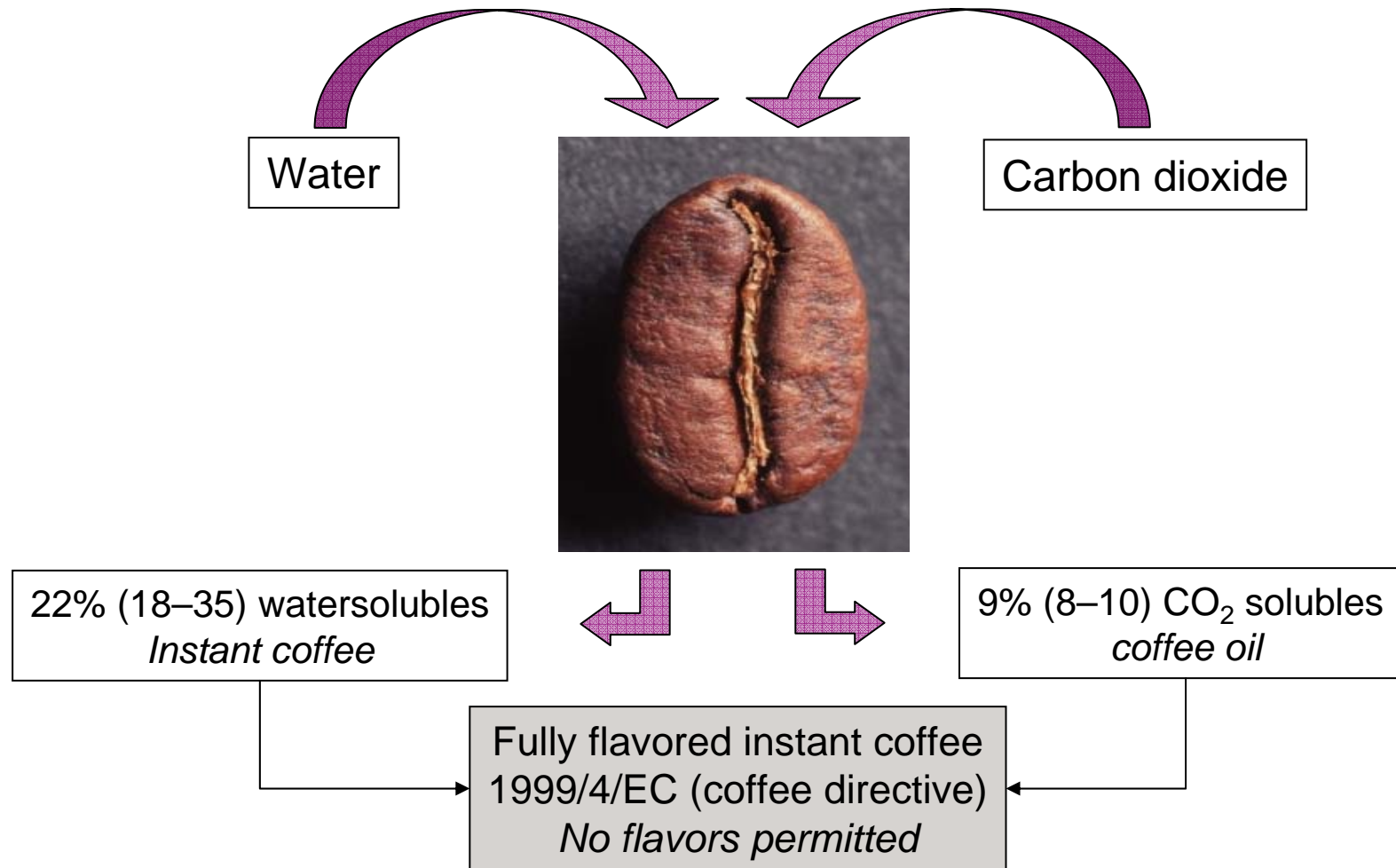
Obtaining concentrated citrus oils with different degrees of folding



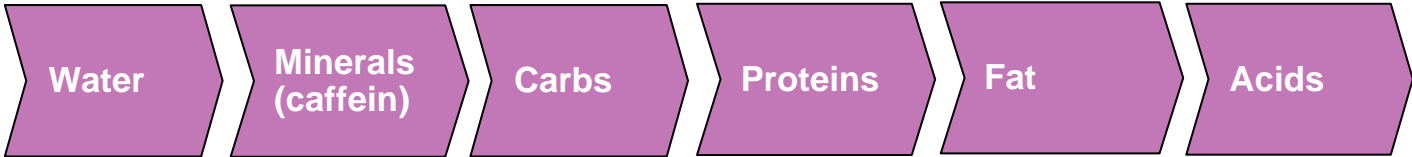
Extraction of roasted coffee by supercritical carbon dioxide



The coffee solubles

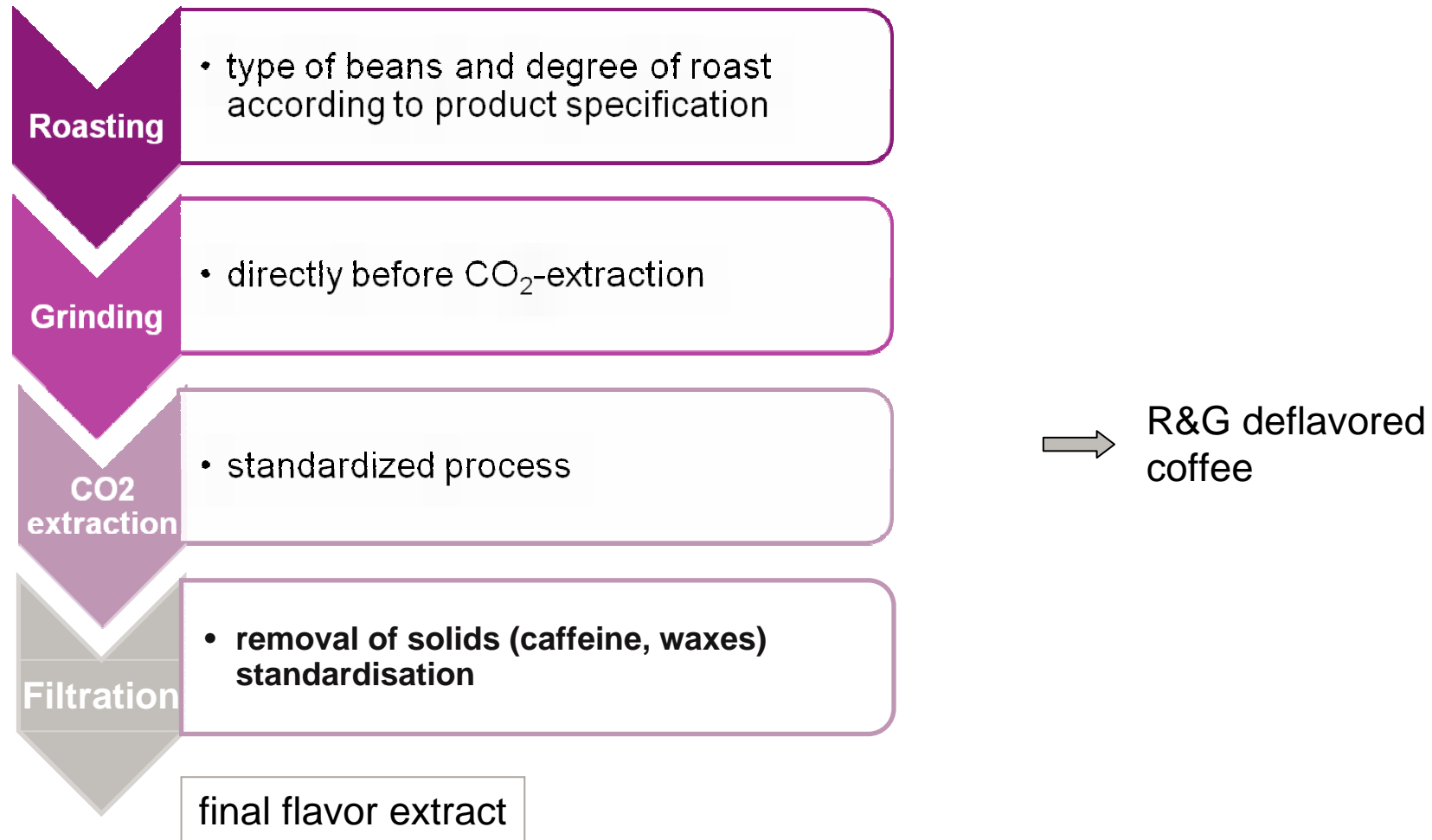


Composition of coffee extracts

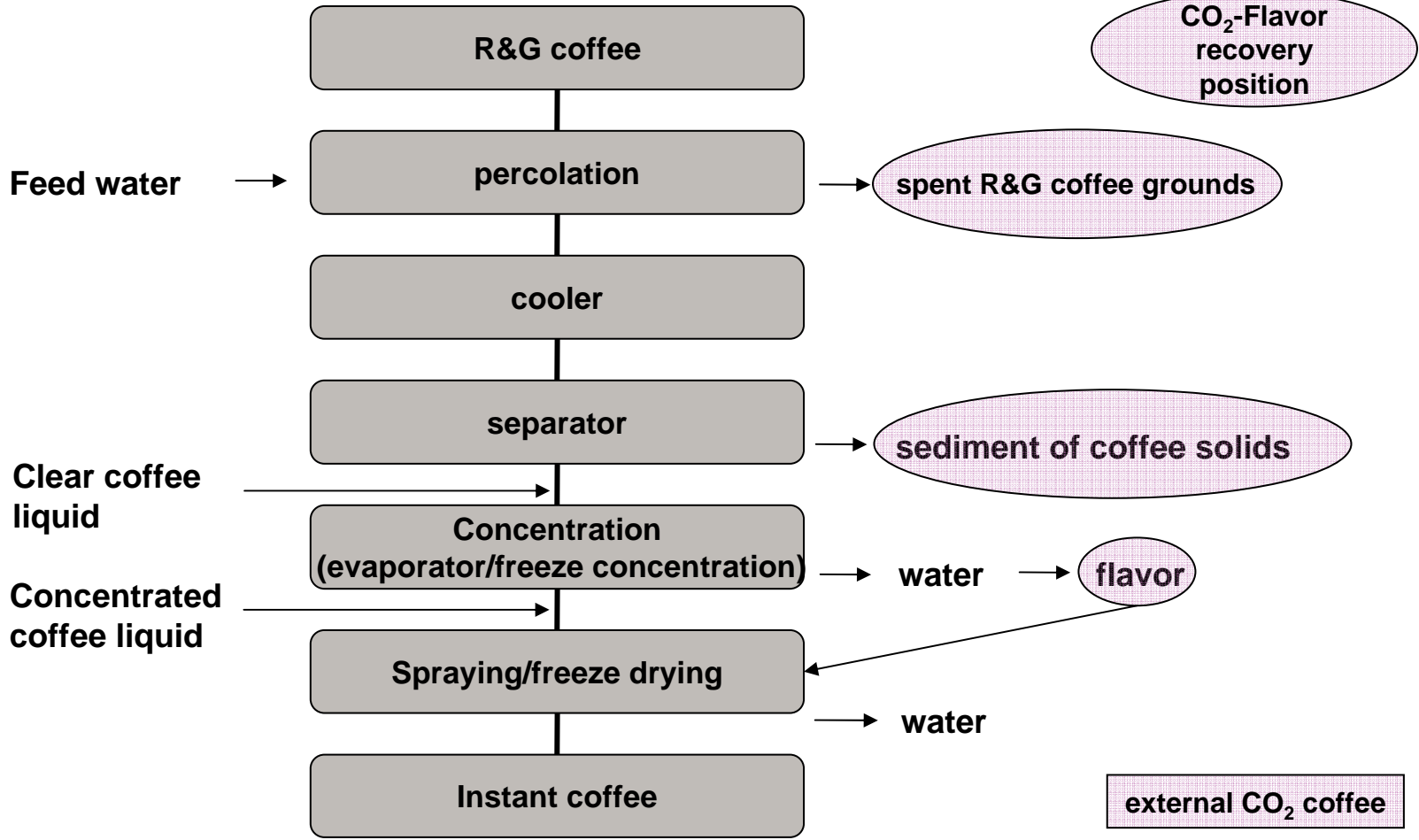


	Water	Minerals (cafein)	Carbs	Proteins	Fat	Acids
<i>WATER</i> Coffee extract	2-5	8-15	26-43	1-15	0-2	10-16
<i>Carbon dioxide</i> coffee extract	0-1	0-1			>98	

Flow sheet for coffee flavor CO₂ extraction



How to improve the instant coffee process



Coffee CO₂ flavor extract portfolio



Available as water- and oil soluble versions

concentration in relation to
the roasted coffee

ARABICA

03-2032 Brazil, New guinea, Indian Perl

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ESPRESSO

03-3882 Honduras/Indian Cherry

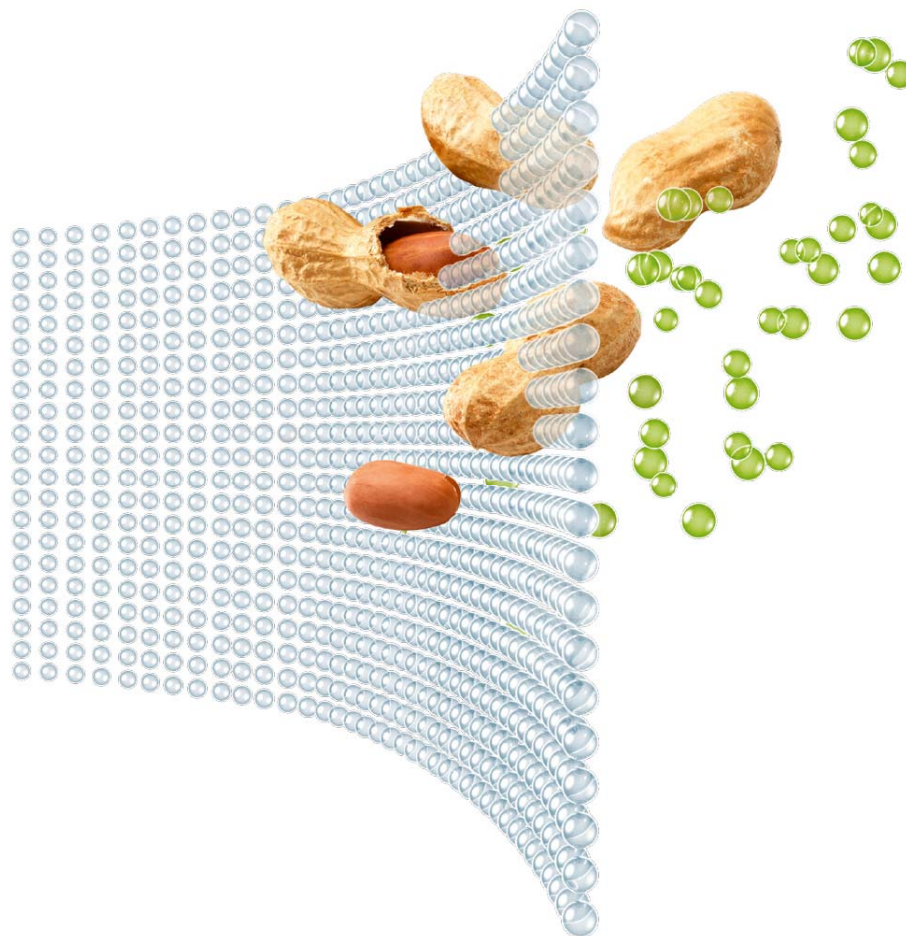
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Coffee flavor portfolio (advantages)



- Gentle CO₂ extraction preserves the sensible coffee flavor completely (no staling)
- Enhanced shelf life (minimum 1 year)
- Complete flavor profile of all character impact compounds without process derived artefacts
- Absolute natural (100% FTNS)
- Complete compliance with food regulations worldwide
- Easy application due to high concentration
- Available in oil-/soluble versions
- No caffeine impact
- Perfect building block for coffee drinks, confectionary, chocolates, instant powders

Extraction of roasted peanut oil by supercritical carbon dioxide



Advantages & benefits (1)



25 folded concentration compared to roasted peanut press oil



- high flavor power
- opens innovative / flexible applications

Complete natural flavor profile
– balance of creamy and roasted impact



- high recognition
- high acceptancy as genuine peanut flavor

Constant quality thanks to:
a) tightly specified peanut oil
b) secured peanut oil sources
c) state-of-the-art extraction process with supercritical carbon dioxide

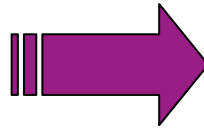


- guarantees a constant flavor profile
- secures flavor formulas
- simplifies QA

Advantages & benefits (2)



- 100% from the named source
- Free of process derived artefacts
- Free of solvent residues
- Free of technical adjuvants
- Free of pollutants
- Free of natural toxins
- Free of microorganisms



„Easy“ regulatory (no issues)

- Clean label: flavor preparation
- Fully compliant with all food regulations, worldwide
- Organic compliant (EU, NOP)
- No limitations for application & dosage (quantum satis)
- Risk free application

Advantages & benefits (3)



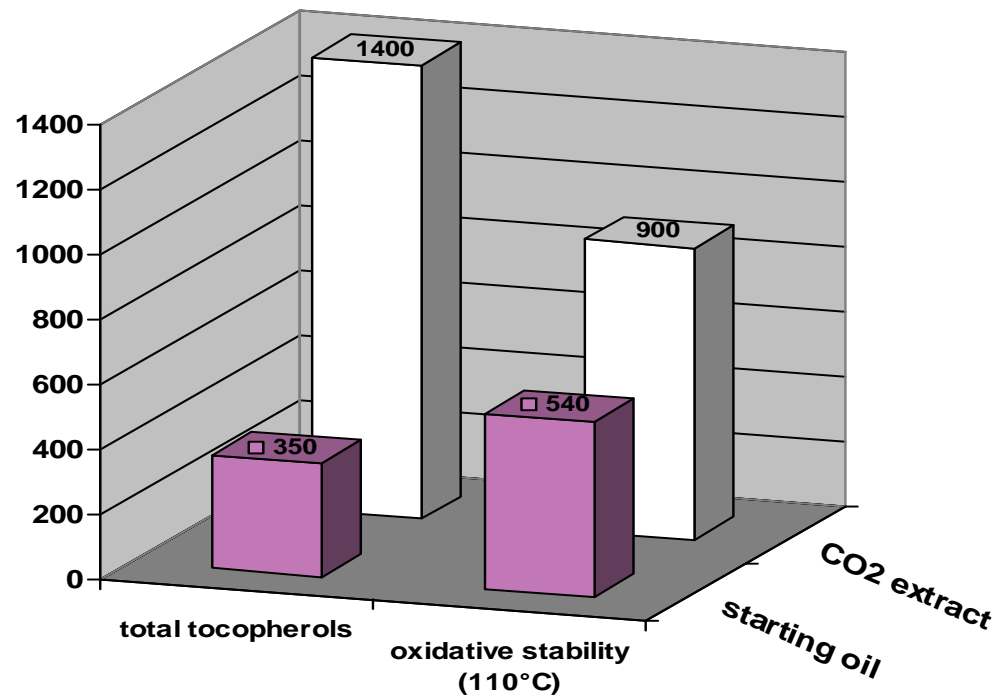
- High flavor power → 1 kg extract equals approx 25 kg high roast peanut oil
- Fatty acid profile authentic to natural unprocessed peanut oil within natural fluctuation → No *trans* fatty acids
- Low dosage to achieve fully flavored application → No negative impact on:
 - a) mouth feeling
 - b) texture
 - c) caloric situationno solubility or homogeneity concerns
- Usage as building block together with NI or natural molecules or as stand alone → Perfect fit for innovative flavor creation
- Oilsoluble or watersoluble versions available → No limitations for application
 - a) fat based formulas
 - b) water based formulas

Enhanced stability of extract

Naturally occurring tocopherols are folded 4 times by CO₂ extraction



Oxidative stability doubled in Rancimat stress testing at 110 °C



Easy product storage



- Saving of storage capacity in comparison to natural peanut oil



95% space savings

- Easy-to-store
no refrigeration mandatory



Reduced warehouse costs
extended shelf life

- Reduced risk of product alteration due to enhanced product stability



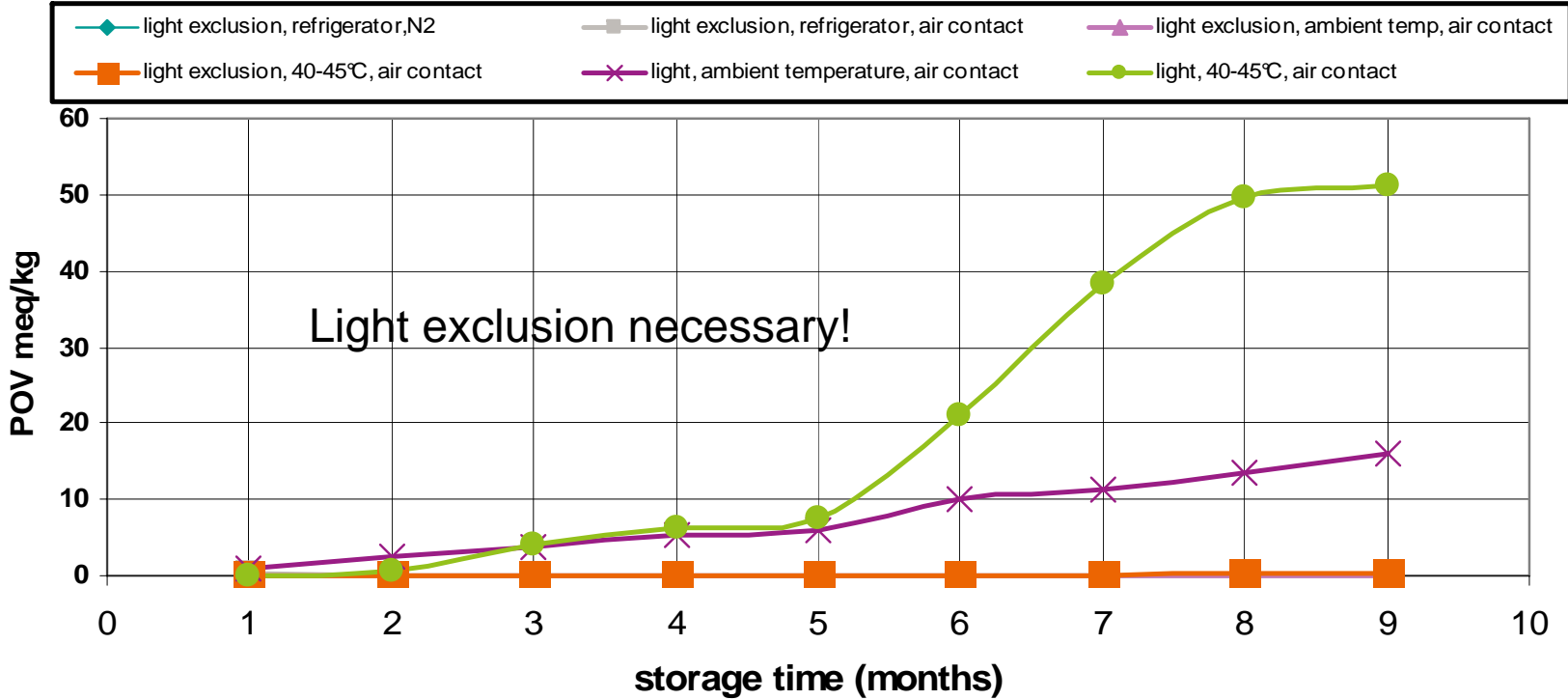
- Easy and secured
- planning
- purchasement

Enhanced independency
from market shifts

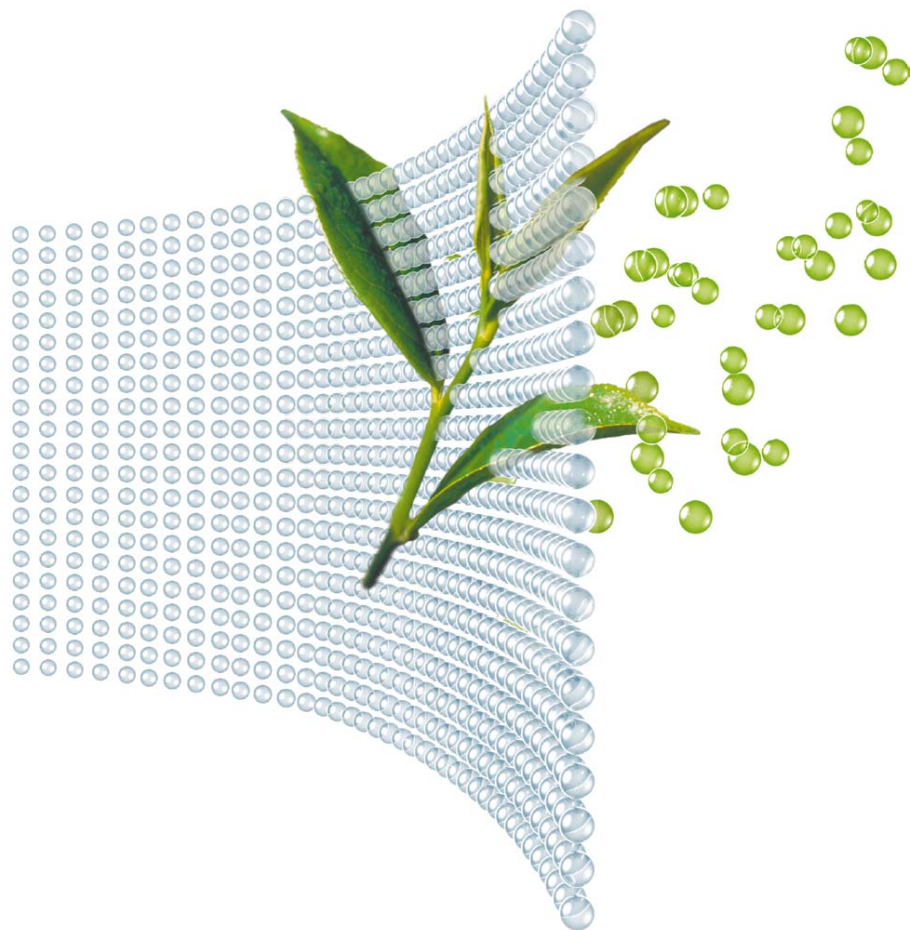
Storage risk elimination



Influence of storage conditions on peroxide development



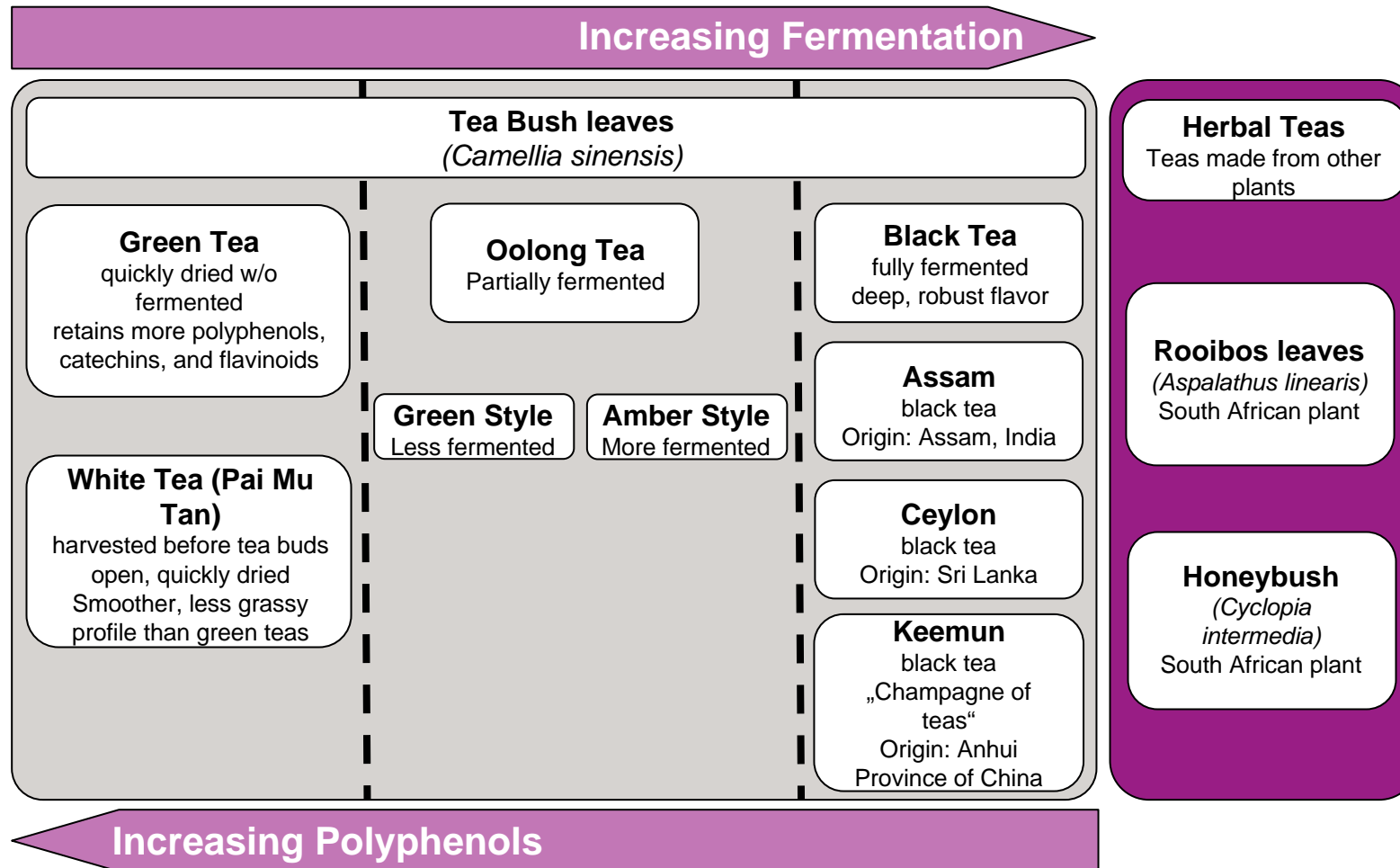
Extraction of tea leaves by supercritical carbon dioxide



Different solvents – different tea extracts






Types of Tea



Flavor & product quality (1)

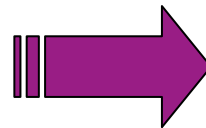


- Pure top notes (volatiles) of tea in high concentration
basically no polyphenols (no body notes) 
 - high aroma power without adstringency
 - ideal to pronounce tea smell without body impact
- Complete natural aroma profile of the individual tea present in extract 
 - enables easy recognition of individual tea variety & origin
- Constant quality thanks to:
 - a) tightly specified tea leaves
 - b) secured tea leave sources
 - c) tightly controlled and supervised manufacturing process with CO₂
 - guarantees a constant aroma profile
 - secures flavor formula

Flavor & product quality (2)



- 100% from the named source (FTNS)
- Free of process derived artifacts
- Free of solvent residues
- Stabilized & standardized with natural alcohol as carrier
- Free of pollutants
- Free of natural toxins







„Easy“ regulatory (no issues)

- clean label: flavor preparation
- fully compliant with all food regulations, worldwide
- organic compliant (EU, NOP)
- no limitations for application & dosage (quantum satis)

Flavor & product quality (3)



- high aroma power  1 kg extract equals the quantity of volatiles from 10 kg leaves
- low dosage to achieve fully flavored applications  No negative impact on:
 - a) mouth feeling
 - b) texture
 - c) caloric situationno homogeneity concerns
- Flexible application as
 - a) building block together with nat identicals or natural aroma chemicals
 - b) as stand alone flavoring material Perfect fit for innovative flavor creation
- Clear and transparent liquid complete solubility in water or dairy based RTD applications  General flavoring tool for beverages

Easy product storage



- Easy-to-store
no refrigeration mandatory
although recommended



Reduced warehouse costs

- Reduced risk of product alteration due to
enhanced product stability



-Easy and secured
- planning
- purchasement

Enhanced independency
from market shifts

- Reduced risk of product alteration due to
enhanced product stability



Shelf life 3 years
guaranteed

but practically much longer



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