

Risk profile of plant food supplements

What is a food supplement?

- Foods that don't look like foods (e.g. tablets) or which are used differently than ordinary foods
- Intention is to supplement diet
- Concentrated sources of nutrients or other substances with a nutritional or physiological effect
- Regulation: directive 2002/46/EC and national legislation (78/2010)
- Food supplements should not be significant sources of energy

Use of plant food supplements (PFS)

- Is increasing in Europe
- Are used also to treat diseases, even though they should not be
- Use can be problematic e.g.:
 - PFS is toxic as such
 - Several PFS are used that have interactions
 - PFSs are used with medication, which can lead to interactions
 - PFS is used as an only treatment for diseases which require medical treatment

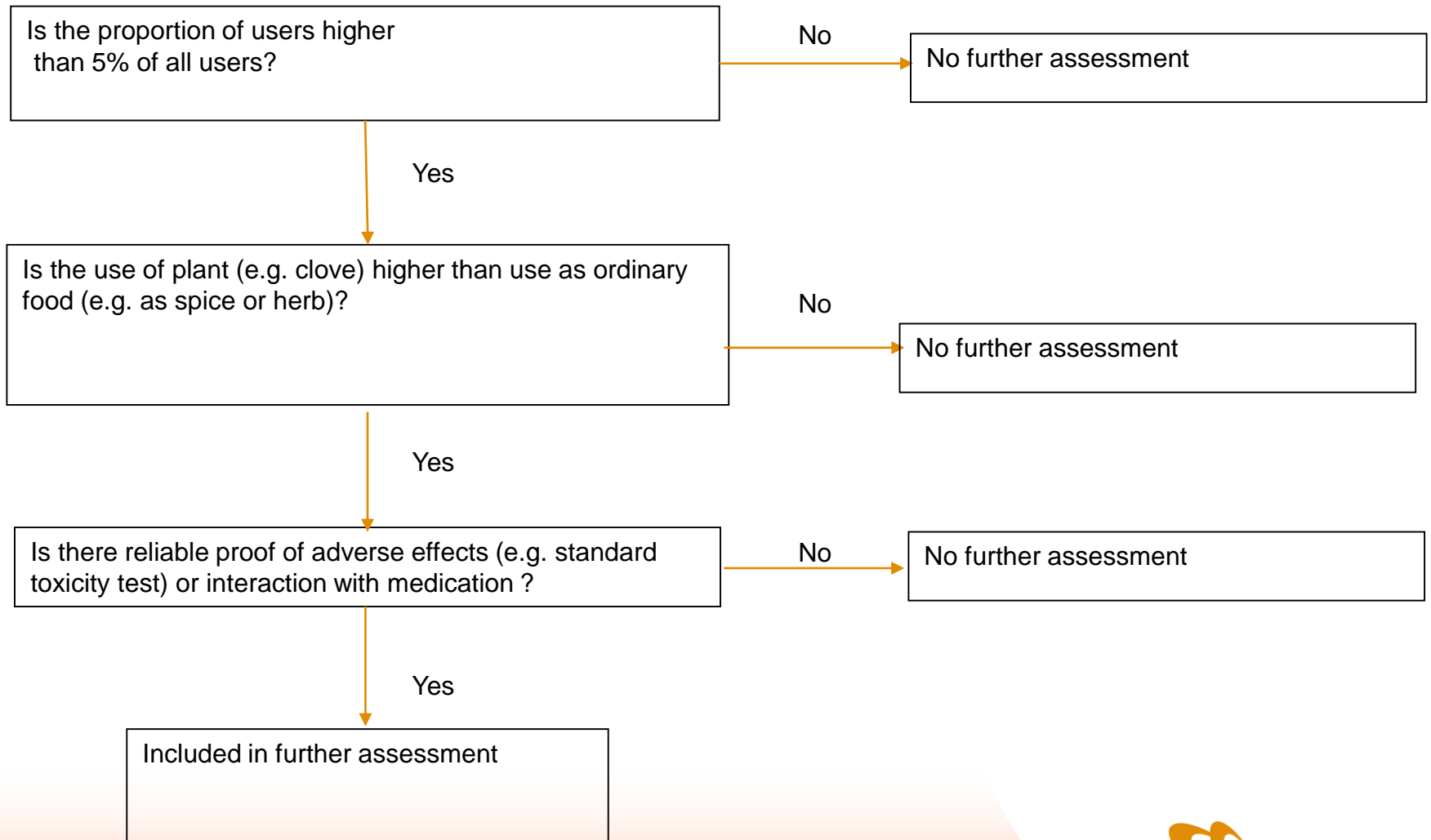
Plantlibra

- EU funded project which investigated risks and benefits of PFSs
- Evira was partner in Finland with National Institute for Health and Welfare
- Evira also participated to a survey which investigated the use of PFSs
- A comprehensive interview among PFS users (n=402 in Finland) on products, amounts, reasons and frequency of use, observed benefits and adverse effects, health status, medication, and life style factors
- Finnish Risk profile of PFSs is based on Plantlibra data concerning Finland

Plantlibra: Results

- Typical in Finland:
 - PFS consumption is periodic
 - Several PFSs are consumed at the same time
 - Other food supplements are consumed with PFSs
 - PFS consumption is not reported to doctor or pharmacist

Plant food supplement risk profile



Risk profile: choice of plants I

Plant	User proportion, %	Amount higher than in ordinary food use	Information on hazard or interaction with drugs available	Included in risk profile
Soy (<i>Glycine max</i>)	18	yes	yes	yes
Echinaceae sp.	14	yes	yes	yes
Pepermint (<i>Mentha x piperita</i>)	12	yes	yes	yes
Rice (<i>Oryza sativa</i>)	see below red yeast			
Thyme (<i>Thymus vulgaris</i>)	12	yes	yes	yes
Lemon (<i>Citrus limon</i>)	11	no		no
Sage (<i>Salvia officinalis</i>)	11	yes	yes	yes
Nettle (<i>Urtica dioica</i>)	11	yes	no	no
Evening primrose (<i>Oenothera</i>)	11	yes	no	no
Wheat germ (<i>Triticum aestivum</i>)	10	no		no

Risk profile: choice of plants II

Plant	User proportion, %	Amount higher than in ordinary food use	Information on hazard or interaction with drugs available	Included in risk profile
<i>Malpighia glabra</i>	10	yes	no adverse effects	no
Ginger (<i>Zingiber officinale</i>)	10	yes	yes	yes
Lemon balm (<i>Melissa officinalis</i>)	10	yes	no	no
Cinnamon (<i>Cinnamomum</i>)	9	no		no
Anise (<i>Pimpinella anisum</i>)	9	no		no
Lavender (<i>Lavandula angustifolia</i>)	8	no		no
Clove (<i>Syzygium aromaticum</i>)	8	no		no
Nutmeg (<i>Myristica fragrans</i>)	8	no		no
Blackcurrent (<i>Ribes nigrum</i>)	8	yes	no	no
Lemon grass (<i>Cymbopogon citratus</i>)	7	no		no
Red yeast (<i>Monascus purpureus</i>)	7	yes	yes	yes

Risk profile: choice of plants III

Plant	User proportion, %	Amount higher than in ordinary food use	Information on hazard or interaction with drugs available	Included in risk profile
Bilberry (<i>Vaccinium myrtillus</i>)	7	no		no
Flax (<i>Linum usitatissimum</i>)	7	no		no
Carrot (<i>Daucus carota</i>)	6	no		no
Horsetail (<i>Equisetum arvense</i>)	6	yes	yes	yes
Garlic (<i>Allium sativum</i>)	6	yes	yes (interactions)	yes (interactions)
Tea (<i>Camelia sinensis</i>)	5	yes	yes	yes
Sunflower (<i>Helianthus annuus</i>)	5	no		no
Olive (<i>Olea europaea</i>)	5	yes	no	no
Fennel (<i>Foeniculum vulgare</i>)	5	yes	yes	yes
Sea buckthorn (<i>Hippophae rhamnoides</i>)	<5			no
Grape vine (<i>Vitis vinifera</i>)	<5			no

Case: red yeast rice (RYR)

- Produced by incubating rice in 37 centigrades with red yeast starter for two weeks
- No standard production methods, therefore there is significant variation in levels of contaminants
- Is used for hypercholesterolemia, probably instead of statins
- Contains monacolins, of which one is lovastatin
- Lovastatin is also a prescribed medication for hypercholesterolemia
- Other monacolins may also have serum cholesterol lowering properties
- Lovastatin in RYR influences CYP3A4 activity
- RYR may contain contaminants, e.g. hepatotoxic citrinin
- Lovastatin is very thoroughly investigated medicine: main potential health hazards are elevated liver transaminase and elevated diabetes risk

Red yeast rice (RYR)

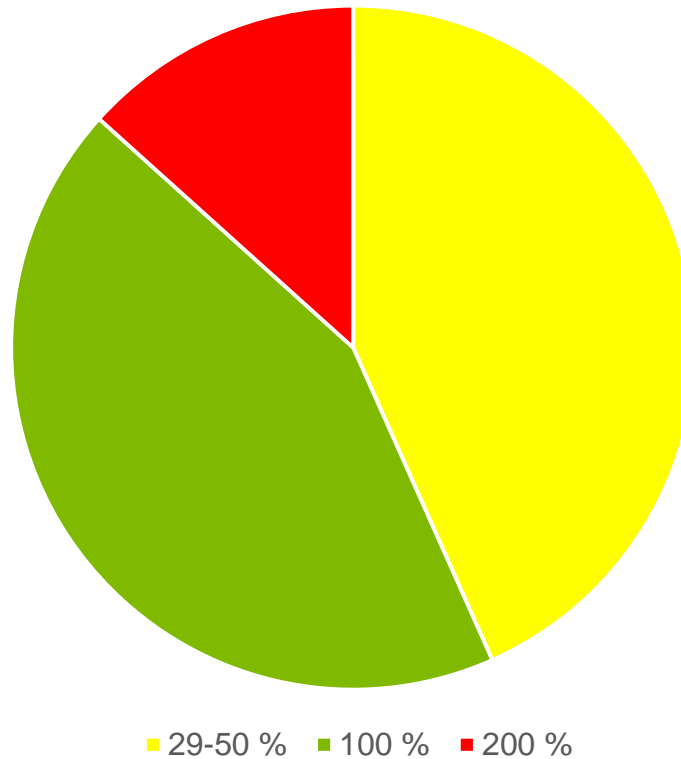
- Google search for "statins" in Finnish:
 - "Statins are a hazard for your health"
 - "Statins and blood pressure drugs don't mix"
 - "Statins cause coronary heart disease"
 - "Statins and their supposed beneficial effects are likely to be the biggest medical deceit ever"
(Magneettimedia)

Red yeast rice (RZR)

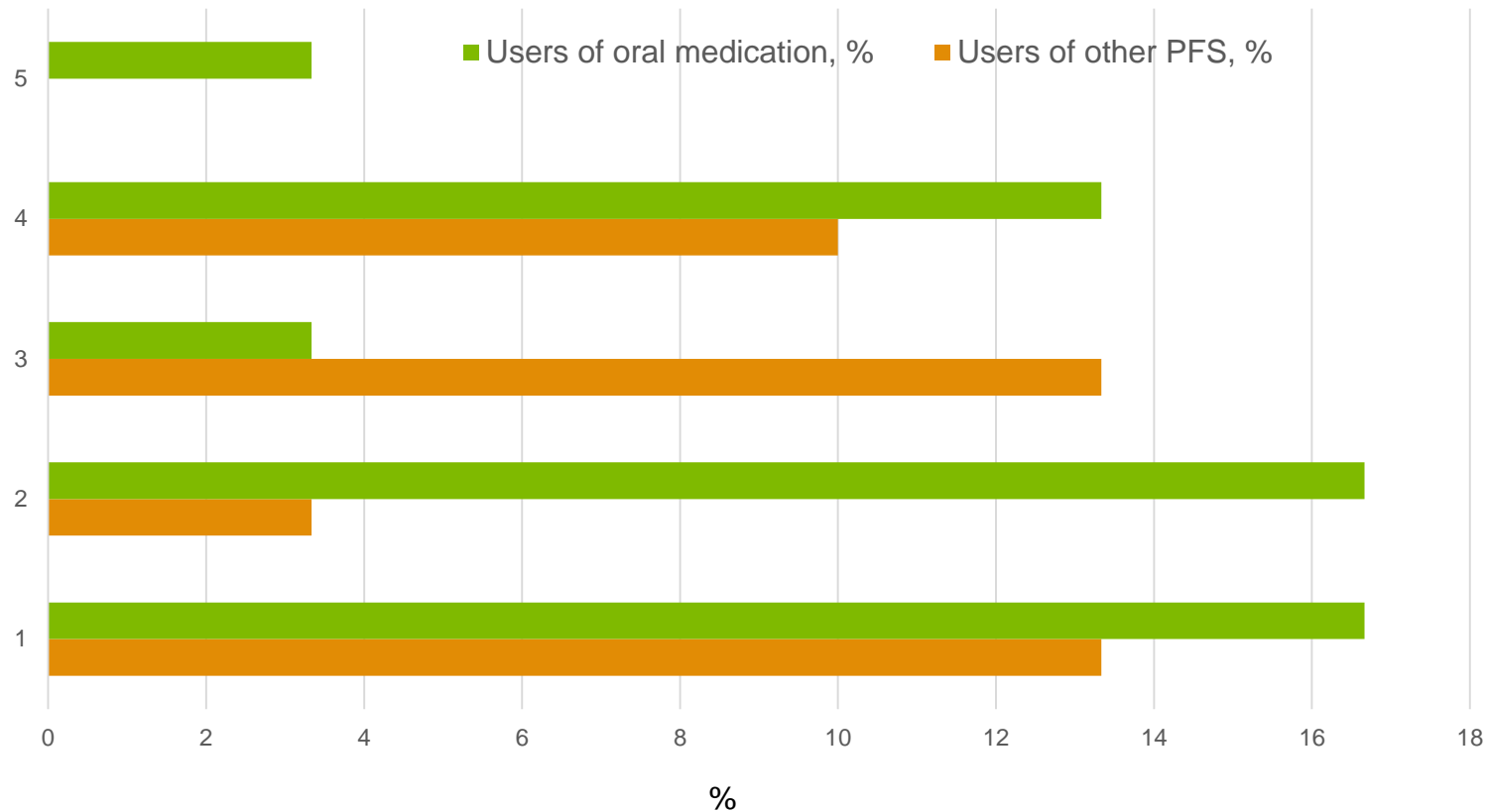
	RZR supplement users (n=30)	All food supplement users (n=401)
Age, years (mean, STD)	57.3 (13.9)	48.5 (15.7)
Gender (male/female, %)	60.00/40.00	48.1/51.9
Medical conditions (%):		
High cholesterol	60.0	22.2
Diabetes	20.0	7.2
Heart disease	10.0	4.5
High blood pressure	26.7	19.2
Cancer	13.3	4.0
Chronic anxiety/depression	20.0	9.0
Any regular medication (%)	63.3	48.4
Any special diet (%)	33.2	29.2

Red yeast rice: adherence to dosage instruction

Used dosage in relation to advised dosage by the manufacturer



Red yeast rice: number of other PFS or continuous oral medication



Red yeast rice

- Two persons reported elevated liver enzymes as adverse effect
- Only half of respondents had told to MD about use of RYR
- None of the respondents told to pharmacist about RYR use
- Only one respondent used also statin medication (simvastatin)
- Two respondents used medication (warfarin, amlodipin) that could have pharmacokinetic interaction with RYR (CYP3A4)

Red yeast rice: Conclusions

- Serious direct health risks caused by RYR are not probable, even though two users reported elevated liver enzymes
- There may be a risk that users of RYR stop using statins which are prescribed by MD
- Interactions with medications (e.g. warfarin) are possible