Imagine standing in the middle of Iceland’s wilderness, by a river lined with wet and brightly coloured moss.

In the distance you see curious volcanic rock formations, and far beyond that a magnificent glacier sitting atop an active volcano.

There is not a single tree in sight.

You notice a lone plant nesting on a rock midstream. Its beauty is quite different from that of other Icelandic plants, as if it were a survivor from harsher times.

It carries with it the definite hint of a long distant past.

Ancient Icelanders lived in this area, and here, the Vikings themselves gathered the herb before sailing to Europe, using it as currency in trade.

This is Angelica; the angel’s herb.
SagaPro
Urinary Function Support

Reduces frequency of urination

Target groups:
• Men with prostate enlargement
• Women and men with an overactive bladder
• People with nocturia (urinary frequency at night)

Fast acting:
• Only 1-2 tablets per day
• Results normally after 1 month or sooner
• Easy to measure by counting trips to the bathroom

Market experience:
• Sold in Iceland since 2005
• Most popular herbal supplement produced in Iceland
• Has replaced “Saw Palmetto” as #1 product for urinary frequency in Iceland

Bioactivity:
• Calms bladder muscle contraction
• Does not reduce libido or affect testosterone
• Safe and well tolerated, as demonstrated in a clinical study

Origin:
• From Angelica leaf gathered in pure, Icelandic nature
• Angelica has been used in Iceland for 1100 years
• Eco-friendly harvesting

Supplement Facts
Serving Size 1 tablet

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angelica archangelica leaf extract</td>
<td>100 mg*</td>
<td></td>
</tr>
</tbody>
</table>

*Daily Value Not Established.

Nocturia can be caused by BPH and OAB
Nocturia
Urinary frequency at night

The problem

“Nocturia” is a clinical term for unusually high urinary frequency at night.

Nocturia can be caused by different factors, including prostate enlargement and overactive bladder. People should always get a proper diagnosis from their doctor.

<table>
<thead>
<tr>
<th>Prostate enlargement</th>
<th>Overactive bladder</th>
</tr>
</thead>
<tbody>
<tr>
<td>The prostate gland is part of the male anatomy</td>
<td>Becomes more common with age</td>
</tr>
<tr>
<td>Starts affecting men in their 50s and increases</td>
<td>Affects both men and women</td>
</tr>
<tr>
<td>A benign condition and a natural, common occurrence. However, it can cause various physiological problems.</td>
<td>Is not considered a normal part of aging</td>
</tr>
<tr>
<td>One of the most common symptoms of prostate enlargement is the frequent need to urinate.</td>
<td>Many possible causes, including involuntary bladder muscle contraction.</td>
</tr>
<tr>
<td>Prostate enlargement can constrict the flow of urine.</td>
<td>When this is the case, smooth muscle cells in the bladder contract spastically and this is followed by the urgent need to urinate.</td>
</tr>
<tr>
<td>This can make urinating more difficult and hinders the man’s ability to fully void his bladder. If the bladder is not emptied properly, the urge to urinate becomes more frequent.</td>
<td>An overactive bladder can cause a sudden and urgent need to urinate, both day and night</td>
</tr>
</tbody>
</table>

Nocturia can cause substantial sleep deprivation
Having to make frequent bathroom trips can be a very uncomfortable condition. Waking up frequently during the night can lead to a serious lack of sleep which, in turn, may cause various problems in daily life.

Lack of sleep has been linked to many serious health issues, such as stress. That by itself is a serious health concern and if people sleep poorly on a regular basis they may face physical and mental health problems. Spouses are also likely to suffer because of nocturia. Getting in and out of bed can be very disruptive to everyone’s sleep. Urinary frequency can therefore quickly become a couple’s problem.

Poor sleep ultimately affects people’s productivity and can as a result lead to lower job performance and less income.

Efforts of Sleep Deprivation

- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Increased heart rate variability
- Risk of heart disease
- Decreased reaction time and accuracy
- Tremors
- Aches

Others

- Growth suppression
- Risk of obesity
- Decreased temperature

SagaPro comes from Iceland

ICELANDIC. PURE. EFFECTIVE.
Iceland

Iceland is a remote island in the North-Atlantic ocean.

It’s not a small island. That’s a common misconception, perhaps stemming from its small population of only 320,000. By area it’s quite large, or approximately the size of Kentucky.

Due to its northerly location, Icelanders see very sharp changes in daylight over the course of a full year.

During the dead of winter Icelanders must settle for a paltry 2-4 hours of sunlight per day. Some towns that are bounded by tall mountains on all sides go without direct sunlight for months.

On a brighter side, during summer Iceland is literally bathed in sunlight. It truly is the land of the midnight sun and its inhabitants enjoy soaking up the solar energy during summer.

Landscape

Iceland is a very volcanically active island and this gives the country an incredibly diverse landscape. In some places the view is practically lunar. In fact, during the 1960s, NASA sent astronauts to Iceland’s lavafields so they could experience surroundings similar to the moon’s landscape.

Almost 13% of the country is covered by glaciers and their meltwater produces powerful rivers that carve spectacular ravines into the country.

Iceland truly is the land of fire and ice.

Plantlife

Iceland has relatively few plant species compared to other countries with similar weather conditions.

There are two main reasons for this;
First of all, Iceland is quite isolated in the middle of the ocean. For example, when Iceland was settled, foxes were the only land mammals found in the country. This isolation is also the reason why there are relatively few plant species in Iceland.

The second reason is that many species of herb were likely killed off during the last ice age and have since not returned.

Iceland

The land of fire and ice
• Located in the North-Atlantic ocean
• The size of Kentucky
• 320,000 inhabitants
• Was colonized by the Vikings in 874 AD
• Has the oldest parliament in the world
• Has spectacular volcanic landscape and large glaciers
• Icelandic houses are heated with geothermal energy
• One of the longest life expectancies in the world
• Has 1,100 years of tradition with medicinal herbs

SagaPro is made from leaves of the Angelica herb
Angelica

Out of Iceland’s many medicinal herbs, Angelica archangelica is the one most deeply rooted in the country’s history. Iceland’s founding fathers held this potent plant in high esteem and used it for various medicinal purposes.

Angelica is a truly spectacular herb. In Iceland it stands 6 feet tall by late summer and - since Iceland has very few trees in general, rich green Angelica fields are a prominent feature in many areas.

There are many historical accounts of Angelica which suggest that it was highly thought of throughout the centuries. Many of these accounts are from Iceland - such as one of the most famous chapters in the Icelandic Sagas - Iceland’s literary heritage, where a viking grabbed hold of an Angelica herb to save himself from falling off a cliff.

Angelica is also well-known in many other countries. In fact, its Latin name, Angelica archangelica, comes from an old story about a monk. This monk was said to have been visited by an archangel who pointed to the herb saying it was a cure for plague. Later, when the Latin name of the herb was formulated this story of the archangel was obviously being referred to.

“Angelica archangelica”

• is one of the few plants in Iceland that survived the last ice age
• has been used in Iceland for 1100 years
• was used as currency by the Vikings
• is named after an archangel and therefore often called “The Angel’s Herb”
• was so valuable in medieval times that Iceland’s first lawbook specifically banned angelica theft.
SagaMedica is an Icelandic producer of high-quality natural health products.

The company was founded after years of pioneering research on Icelandic medicinal herbs. It is one of the fastest growing companies in the Icelandic natural products industry.

**SagaMedica**

- A leading natural products manufacturer in Iceland
- Founded in 2000 following almost a decade of research at the University of Iceland
- Is set on becoming a leader in the marketing of products from Nordic medicinal herbs

SagaMedica was co-founded by this scientist.
Dr. Gudbjarnason

SagaMedica’s director of research, Dr. Sigmundur Gudbjarnason, is a professor emeritus of biochemistry and former president of the University of Iceland. He has studied Icelandic flora extensively since 1992. As any good researcher would do, he initially started looking into the matter out of plain curiosity. Since Icelandic herbs hadn’t been widely studied in his particular field, Dr. Gudbjarnason was a skeptic at first. However, the historical evidence was too compelling to ignore and he sought to explain it with scientific methods.

There are written accounts of Angelica use in Icelandic history, including a 150-year-old medical book, which is still in use today and details how Angelica may be used for medicinal purposes. Iceland’s oldest law book, Grágás, written in the early 12th century, even has a law strictly forbidding the theft of angelica plants. Those who could not resist the temptation of snatching a few plants from their neighbour’s backyard faced a substantial fine.

Through their research, Dr. Gudbjarnason and his colleagues have succeeded in shedding a light on the scientific reasons for Angelica’s historical popularity.
Research

SagaMedica’s products are all based on research which Dr. Sigmundur Gudbjarnason began in 1992. The findings of this research show Angelica and other Icelandic medicinal herbs contain numerous bioactive compounds with a variety of efficacies. They can therefore be useful in terms of health and help people prevent a variety of ailments.

SagaMedica has collaborated with many official research institutes in Iceland

Agricultural University of Iceland
Department of Pathology, University of Iceland
Department of Pharmacy, University of Iceland
Research Institute of the Icelandic Cancer Society
The Microbiology Institute, University of Iceland
The Science Institute, University of Iceland
The Virology Institute, University of Iceland

SagaMedica’s research work

• Dr. Gudbjarnason began his research in 1992
• Steinthor Sigurdsson joined Dr. Gudbjarnason in 1995
• SagaMedica’s scientists have published 4 peer-reviewed studies
• SagaMedica has mapped Angelica all over Iceland with GPS, analyzing its biochemical content
• Steinthor earned his PhD in 2009 for biochemical research on Icelandic medicinal herbs
• Clinical study on SagaPro - the first-ever on an Icelandic natural product

SagaMedica has more than one theory about SagaPro
How does SagaPro work?

How does SagaPro work in cases of frequent urination?

SagaPro can reduce frequent urination in people with an overactive bladder and men with benign prostatic hyperplasia. This is likely due to inhibition of leukotriene activity.


SagaPro contains natural products which inhibit the activity of leukotrienes (LTD4), either by inhibiting the production of LTD4 or by inhibiting their binding to receptors in smooth muscle cells in bronchial tubes, urethra or bladder.

Leukotrienes are compounds which are derived from arachidonic acid (20:4n-6) in lung tissue and smooth muscle cells in arteries and other tissue.

Leukotrienes are also formed in the bladder and cause bladder muscle contractions by stimulating receptors.


SagaPro contains a selection of compounds from Angelica

SagaPro may relax smooth muscle cells in the bladder by inhibiting leukotriene activity but there are other possible explanations, too, since SagaPro has many bioactive compounds.

It may affect the prostate directly by reducing inflammation but SagaMedica believes it to operate differently since women also benefit from SagaPro.
Bioactive compounds

What are the bioactive compounds in SagaPro?

There are many compounds and many of them are yet to be exactly identified, which is common with herbal extracts.

- SagaPro contains “isoquercitrin”, a flavonoid which calms smooth muscle cell contraction
- SagaPro is based on a water-extract from Angelica leaf
- It therefore contains very low levels of furanocoumarins because they are practically not water-soluble which means SagaPro will not have a phototoxic effect on the skin
- And since SagaPro is a water extract, there is also no indication it can affect testosterone levels

Principal constituents

The exact composition of the aqueous extract is not known. Constituents of the herbal preparation include:

- Flavonoids, most abundant being isoquercitrin.
  
  Isoquercitrin is a flavonoid in SagaPro. It inhibits leukotriene-induced contraction of smooth muscle cells and this explains the effect on the urinary tract.

- Chlorogenic acid, a polyphenol derived from cinnamic acid.
  
  Chlorogenic acid is another polyphenol in SagaPro with antioxidant properties and anti-carcinogenic, anti-viral and anti-bacterial activity.

- Phenylpropanoids, i.e. coumarin derivatives
  
  In minute amounts due to the poor water solubility of these compounds. Xanthotoxin is the most abundant of the furanocoumarins present. Low levels of furanocoumarins prevent SagaPro from having a phototoxic effect on the skin.
Raw material

SagaMedica’s Angelica comes from many places in Icelandic nature. Among these is Hrísey island.

Hrísey is a remote island in North Iceland. During summer, the word “night” loses its meaning to the islanders, as Hrísey is bathed in perpetual sunlight around the clock.

Angelica this far north needs to grow as fast as possible during the short but beautiful summer. It’s bathed in sunlight, day and night, and grows quickly to an impressive height of up to 6 feet. By late summer it’s ripe and ready for use by the locals, who eat the seeds for breakfast and drink warm angelica tea during the dark winter which inevitably follows.

**Hrísey Island**

(pronounced “hreesay island”)

- This island is one of SagaMedica’s main sources for Angelica
- The island has a population of 180 people
- It gets almost 24 hours of sunlight per day during Angelica’s main growth period
- Inhabitants drink Angelica tea and use Angelica seeds as breakfast cereal
Harvesting

Angelica grows all over Iceland. It is by no means endangered and its proliferation is even considered too intense in some areas. In certain places, SagaMedica’s harvesting can benefit local authorities that would otherwise have to eradicate the plant in a costly way.

SagaMedica works with local people who know their area like the back of their hand. That type of knowledge helps in choosing the best spots and since locals can follow the development of Angelica fields over many years they provide information which ensures that the Angelica fields aren’t overused.

SagaMedica’s Angelica Harvesting

- Is performed by local people in a responsible way
- Is done in several places in Iceland, allowing SagaMedica to rest areas if needed
- Offers jobs to farmers and young people in the summer
- Is performed in such beautiful surroundings that tourists want to come and experience it
### SagaPro™ vs. Saw Palmetto

<table>
<thead>
<tr>
<th>Meant to work on</th>
<th>SagaPro</th>
<th>Saw Palmetto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder</td>
<td></td>
<td>Prostate</td>
</tr>
<tr>
<td>Mechanism</td>
<td>Calms and relaxes bladder muscle</td>
<td>Reduces prostate size</td>
</tr>
<tr>
<td>Herb</td>
<td>Angelica archangelica</td>
<td>Serenoa repens (some products may contain more herbs)</td>
</tr>
</tbody>
</table>

| For men | Yes | Yes |
| For prostate enlargement | Yes¹ | Yes |
| For nocturia | Yes | Yes |
| For enuresis | Yes | Yes, for adult males |
| For women | Yes | No |
| For overactive bladder | Yes | No |
| Hormonal effect on body | No | Yes |
| Time to results | Weeks | Months |
| Safety | Safe according to clinical study² | Depends on product and study³ |
| Number of herbs in product | One⁴ | Depends on product |
| Clinically studied | Yes | Depends on product⁵ |

¹ SagaPro affects the bladder and reduces urinary frequency. It therefore reduces the #1 cause of complaint from men with prostate enlargement.

² With respect to adverse events, there was no difference between treatment groups receiving either SagaPro or a placebo. No serious events were reported in the study.

³ Although many Saw Palmetto products have been clinically studied, other Saw Palmetto products have not. A product containing a "clinically proven formula" has not necessarily undergone a clinical trial.

⁴ SagaPro contains a single herb; Angelica archangelica. Many Saw Palmetto products contain several herbs. All things being equal, a “single ingredient” product is safer by default.

⁵ A clinical study on different Saw Palmetto formulas does not equal a clinical study on every Saw Palmetto product.
Angelica has been one of Iceland's most important medicinal herbs for over 1000 years. Research indicates that our ancestors were correct about its powers.

**Ancient Icelandic medical books** claim that Angelica helps people who suffer from pleurisy, infections, poisoning and phlegm in the respiratory tract.

**Research** indicates that compounds in the Icelandic angelica herb can:
- Reduce frequency of urination
- Prevent viral infection
- Promote a healthy memory
- Counter stress
- Alleviate anxiety

According to Iceland's oldest lawbook, Grágás, Angelica thieves were fined.

Angelica growing in the North has long been believed to be more potent than its Southern varieties.

Angelica is a close relative of ginseng. It is often called the "Ginseng of the North."
Safety Considerations
Safety considerations

Are there any side effects from using SagaPro?
No. There are no known side effects from using SagaPro.

How many SagaPro tablets can I safely take per day?
The daily dosage is 1-2 tablets. They can be taken both at once or at different times during the day, with or without meals. In case of nocturia, we recommend taking SagaPro before bedtime. There is no indication that a larger dose will negatively affect people but the daily amount should not be exceeded without consulting a physician.

Is SagaPro for everyone?
Generally speaking, SagaPro is considered to be safe. It is made from Angelica archangelica leaf, which is classified as GRAS by the FDA (“Generally Recognized as Safe”). Furthermore, SagaPro is made from a water extract. This means that water-insoluble compounds are not extracted during the production process, making the finished product even safer than the herb itself.

In spite of that, we never advise people to use SagaPro without consulting a physician if there is a question of underlying health problems or other factors such as pregnancy, young age or other health concerns.

Can pregnant women use SagaPro?
No. As with all herbal supplements, pregnant or nursing women are advised against using SagaPro without consulting a physician.

Are the inactive ingredients in SagaPro accepted for oral intake?
Yes, all inactive ingredients in SagaPro are generally accepted for use in dietary supplements.

- **Starch**: Widely accepted as a binder in tablet making.
- **Povidone** (polyvinylpyrrolidone): Accepted for use in tablet making by both the FDA and Whole Foods, for example. It facilitates tablet disintegration in the digestive tract, which is necessary for uptake and therefore the effectiveness of the tablets.
- **Dicalcium phosphate**: Widely accepted as a filler in both pharmaceuticals as well as natural supplements.

Can children who wet the bed at night use SagaPro?
Angelica has been used traditionally in Iceland for over 1000 years and it is reasonable to assume that children also consumed the herb. We have heard from several parents who successfully gave SagaPro in smaller doses to their children. However, SagaPro is not particularly intended for children, nor bed-wetting in general. It is always the parents’ responsibility if they choose to give SagaPro to their children.

Can men with prostate cancer take SagaPro?
There is no indication that SagaPro should be harmful in cases of prostate cancer, but as always, consult a physician before using SagaPro if there are any health concerns. Adding to that, the Angelica leaf extract that SagaPro is made of has been shown to have antitumour properties (see our studies for further reference).

Can you take SagaPro while undergoing phototherapy?
Yes. The production process of SagaPro excludes photosensitizing compounds from the finished product which would otherwise make phototherapy or heavy sunbathing advisable.

Why does the Canadian packaging say you shouldn’t take SagaPro in case of phototherapy?
Health Canada regulations require us to put this warning on the packaging simply because SagaPro is made from the Angelica archangelica herb. However, the regulations do not distinguish between the plant itself and the finished product, which has a different biochemical makeup owing to the production process. We are actively working toward having that warning removed as there is no scientific reason for it to be there.

Can people using anti-coagulants use SagaPro?
There is no indication that SagaPro affects coagulation.

Anti-coagulants (which are normally considered good for circulation) have been noted in certain parts of the Angelica herb. However, this is not the case with SagaPro, and anti-coagulation is therefore not a concern.

Does SagaPro affect testosterone levels like some other urinary supplements?
There is no indication that SagaPro affects testosterone levels. Since SagaPro is made from a water extract, water-insoluble compounds, some of which could affect testosterone levels, are excluded during production.
SagaVita

For strength and vitality

SagaVita is produced from seeds of the Icelandic medicinal herb Angelica archangelica. The seeds contain compounds that help to ward off cold and flu infections and alleviate anxiety.

SagaVita contains natural antiviral compounds, called furanocoumarins, that can prevent viral proliferation and increase resistance to the common cold and other viral infections.

One furanocoumarin, phellopterin, mimics the anxiolytic effects of benzodiazepam, by competing for connection with the same receptors in the brain. Other such furanocoumarins counter stress by reducing cortisol, which is a well-known stress hormone.

Use:
1 teaspoon daily / 1-2 tablets daily

Possible side effects:
Plant allergy is a rare possibility.
Increased photosensitivity of the skin.
Anti-platelet effects. This is normally considered a positive side effect, since it reduces the risk of blood clots. However, people taking blood-thinning medication, or those who will undergo surgery should take caution.

References:
SagaMemo

For healthy memory

SagaMemo is produced from seeds of Icelandic Angelica archangelica and Geranium sylvaticum. When used together, these two herbs show a synergistic effect which results in slower breakdown of a neurotransmitter important for a healthy memory.

Acetylcholine is a neurotransmitter, essential to a healthy memory. Our research has shown that compounds in Angelica archangelica and Geranium sylvaticum synergistically reduce the breakdown of neurotransmitter acetylcholine, by inhibiting the enzyme acetylcholinesterase, which breaks it down. This efficacy is common to most modern Alzheimer’s medications.

These results indicate that the compounds in SagaMemo can prevent or slow dementia and forgetfulness. There is also an indication that they may decrease the formation of cerebral plaques in Alzheimer’s patients, thereby augmenting neurotransmission and improving memory.

Other bioactive compounds in SagaMemo can increase blood flow to the brain. This may be helpful against vascular dementia, the second most common form of dementia after Alzheimer’s disease.

References:

Use:
1 teaspoon daily / 1-2 tablets daily

Possible side effects:
Plant allergy is a rare possibility.
Increased photosensitivity of the skin.
Anti-platelet effects. This is normally considered a positive side effect, since it reduces the risk of blood clots. However, people taking blood-thinning medication, or those who will undergo surgery should take caution.
Voxis throat lozenges

For a sore throat

Voxis is produced from leaves of Angelica archangelica. They contain antiviral phytochemicals which can help to prevent cold or flu infections.

Voxis has been shown to relieve irritating coughs and has a soothing effect on sore throats. It contains menthol and eucalyptus for a refreshing taste.

Use:
As needed

Possible side effects:
Plant allergy is a rare possibility.
Out of Iceland’s many medicinal herbs, Angelica archangelica is the one most deeply rooted in the country’s history. Iceland’s founding fathers held this potent plant in high esteem and used it for various medicinal purposes. Through research, Icelandic natural products developer SagaMedica has discovered that the Vikings knew what they were doing. The company now offers a product line which addresses various health issues, ranging from frequent urination and dementia to cold and flu prevention.

Modern Research Explains Traditional Use
SagaMedica’s director of research, Dr. Sigmundur Gudbjarnason, is a professor emeritus of biochemistry and former president of the University of Iceland. He has studied Icelandic flora extensively since 1992. As any good researcher would do, he initially started looking into the matter out of plain curiosity. Since Icelandic herbs hadn’t been widely studied in his particular field, Dr. Gudbjarnason was a skeptic at first. However, the historical evidence was too compelling to ignore and he sought to explain it with scientific methods.

It is probably no coincidence that Iceland’s highest peak, Hvannadalshnjúkur, is named after angelica, or “hvönn”, as Icelanders call it. Other places named after angelica can be found throughout the country suggesting that Icelanders’ settlers held the plant in high regard.

Written accounts of angelica use are also plentiful, including a 150-year-old medical book, which is still in use today and details how angelica may be used for medicinal purposes. Iceland’s oldest law book, Grágás, written in the early 12th century, even has a law strictly forbidding the theft of angelica plants. Those who could not resist the temptation of snatching a few plants from their neighbour’s backyard faced the punishment of being outlawed.

For Viking Health
SagaMedica’s research even included a field trip to Greenland, where the settlement of Erik the Red was examined. It turned out that angelica found around Erik’s farm was similar to angelica growing in Iceland, but unlike the one growing further north in Greenland. This opens up debate on whether Erik might have taken angelica with him from Iceland and planted it around his new home in Greenland. This also poses another interesting question: Did Erik’s son, Leif, bring Icelandic angelica with him on the epic voyage during which he discovered America?

Although the Vikings had, rather understandably, no possible means of proving the usefulness of the angelica plant, SagaMedica’s researchers have all but nailed it on the head. They have identified many bioactive compounds in angelica which are widely thought to serve a purpose in preventing disease.

SagaMedica currently produces four different products; SagaPro, SagaMemo, Voxis and SagaVita. These are used for frequent urination in men, memory improvement, for sore throats and cold prevention, respectively. SagaMedica is planning many new products and is working with other manufacturers in Iceland to bring natural products of excellent quality to foreign markets.

Angelica Through Your Mail Slot
SagaMedica’s supplements can be bought in Icelandic pharmacies, health stores, supermarkets and in the Duty Free store at Keflavik airport. Most of them can also be purchased online at www.sagamedica.com. SagaMedica ships its products worldwide and they are designed and packed for easy delivery through your mail slot. Attaining and maintaining Viking health for everyday battles has never been easier.
Research since 1992 has confirmed the presence of clinically relevant compounds in Icelandic medicinal herbs. SagaMedica is an Icelandic biotechnology firm that produces dietary supplements from such herbs, including Icelandic Angelica archangelica.

In most people’s minds the Vikings were brave, albeit a bit brutal on occasion, and their bravery is often associated with physical strength and stamina.

Now there is reason to believe they possessed a power of the most curious sort:

Unparalleled urinary constitution (so to speak)

The Vikings were keen consumers of Angelica archangelica. As a result, their bladder control may have been just as much a cause of envy as their superior ships were.

SagaMedica manufactures dietary supplements from Icelandic medicinal herbs. In 1992, one of its founders, Dr. Sigmundur Gudbjarnason, Professor Emeritus and former president of the University of Iceland, began researching forty of the eighty known medicinal herbs in the Icelandic flora.

Dr. Gudbjarnason’s research team has uncovered a wide array of bioactive compounds in both seeds and leaves of the Icelandic angelica herb. These compounds are thought to be helpful in reducing or preventing a surprisingly diverse range of health problems, such as frequent urination, cold and flu infections, asthma, cardiovascular diseases, dementia, anxiety and mild depression.

Traditional use of herbs stimulates scientific research

Is there any truth to claims made in ancient texts of herbs being beneficial in matters of health? Surely medical knowledge in the 14th century was one cough short of the Plague, wasn’t it?

Perhaps so. Yet Dr. Gudbjarnason started his research based on such historical accounts.

“Modern scientific research is often begun on the basis of traditional knowledge. For instance, there is a lot of research on the beneficial effects of Echinacea. That herb was used by native Americans against rattlesnake bites, headaches, burns and swollen glands, and this knowledge spurred the modern research conducted on it today,” says Dr. Gudbjarnason. “The case of the Angelica archangelica is a little different, as it has been neglected for a long time,” he adds.

Thou shalt not steal another man’s angelica

There are historical accounts of Icelandic angelica’s value to people over the last millennium. It must have been widely recognised as a useful herb, as it was even used as currency in foreign trade.

In medieval times Angelica archangelica was considered to be so potent and valuable that Iceland’s first book of law, Grágás, included a law specifically against the “theft of angelica.”

The fact that people have held the herb in such high regard for over a millennium, even passing laws to protect ownership over it, is a pretty good indication of its value at the time.

New online store for foreign markets

SagaMedica is going through exciting times, with new product development and increased distribution worldwide. A new website and online store were opened in June after months of preparation. The store ships to customers worldwide. All products are designed in such a way that they fit through mail slots, making for easy delivery.

It certainly looks as if Icelandic angelica is poised for a healthy comeback.

More information at www.sagamedica.com
Far away from the Evergreen state, past the American continent and across an ocean lies the remote island of Iceland. Icelanders are a resilient nation capable of withstanding the tough conditions their island has to offer. But other things, too, are toughened by the “Land of Ice”.

A robust herb, Icelandic Angelica is one of the few plants to survive the last ice age in Iceland. It grows day and night during the island’s short but beautiful summer. Bathed in midnight sun, by late summer the herb is ripe with high concentrations of precious herbal compounds. This quality is thought to distinguish many northern plants from their less potent siblings growing further south, where the sun sets much earlier.

Scientists from the University of Iceland have studied Angelica—the herb that promote better health and their work has led to the rediscovery of Angelica as a medicinal herb.

SagaPro, produced from wild Icelandic Angelica leaf, is formulated to maintain and improve healthy urinary function. Its main users are those who need to make frequent restroom trips at night. Frequent nighttime urination (nocturia) is a common condition with many causes, including an enlarged prostate in mature men and an overactive bladder in men and women alike. Waking up time and again during the night can cause a variety of problems, since sufferers fail to rest properly overnight. Getting in and out of bed may also be disruptive for spouses. Prolonged lack of sleep may eventually impact the entire family. This condition is surprisingly common in people over 50, making SagaPro a relevant product for many. Let’s look at why SagaPro can make a difference in nocturia.

The extract of Angelica contains several bioactive compounds, flavonoids and other polyphenols, terpenes, coumarins and polysaccharides, all with various biological effects. Nocturia is lessened with SagaPro by inhibiting the activity of leukotrienes (LTD4), either by inhibiting the production of LTD4 or by inhibiting their binding to receptors in smooth muscle cells in urethra or bladder. Leukotrienes are also formed in the bladder and cause contractions by stimulating receptors. When the binding of LTD4 to receptors is prevented by the natural isoquercitrin present in SagaPro, the urethra and bladder relax, improving urination and reducing the need for frequent trips to the bathroom.

SagaPro was first sold in Iceland in 2005. Since it was introduced in Iceland in 2005, SagaPro has become the top product for urinary frequency there. One of the main reasons for SagaPro’s popularity in Iceland is that the daily dosage is only 1-2 tablets before bedtime. Experience shows that many people report a difference in urinary frequency after only 1 package or even less. A clinical study is now being conducted to verify SagaPro’s efficacy. Recently introduced to Americans, SagaPro is only available at a few retail outlets, including Marlene’s Market & Deli.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
SagaPro undergoes clinical study to test efficacy on nocturia in men

Posted on 05 January 2011. Tags: clinical, nocturia, saga pro, sagaMedica, sagapro

SagaMedica is an Icelandic company that specialises in research on Icelandic medicinal herbs and produces effective natural products from them.

Now, a parallel, randomised, double-blind, placebo-controlled clinical study is being performed on the company’s top product – SagaPro, which is used to reduce the frequency of urination in both men and women. The study investigates the effect of SagaPro on nocturia in men and results are due in April 2011.

According to Perla Bjork Egilsdottir, biochemist and SagaMedica’s marketing director, the clinical study is the first one ever conducted on an Icelandic natural product.

“This study is a huge step for SagaMedica and important for the Icelandic natural products industry as a whole”, explained Egilsdottir, adding that many foreign distributors are eagerly waiting for the results of the study. “According to our market experience, SagaPro does not have significant side-effects and we are optimistic that the study will confirm that,” she added.

SagaPro has been very successful since it was launched in 2005. According to SagaMedica, the product has enjoyed increasing popularity among men with prostate enlargement (BPH) and people with an overactive bladder (OAB).

“This rigorous study provides us with the credibility we need to push SagaPro forward and make it an international brand in this very important and growing niche market,” commented Egilsdottir, pointing to the fact that as the general population gets older there will be more need for effective natural products that address this health issue.

SagaPro is made from Angelica archangelica growing wild in Iceland. The herb has been used traditionally for 1100 years by Icelanders. SagaMedica’s scientists have studied the herb since 1992 and their research has shown that it contains various bioactive compounds that are thought to be relevant for health. Among these are flavonoids and other compounds that may play a role in reducing urinary frequency.

SagaPro is available from SagaMedica’s online store and ships worldwide.
Peer-reviewed Studies
SagaMedica’s peer-reviewed studies

These studies have been published in internationally recognized scientific journals. Findings from these studies are not to be viewed as statements of clinical usefulness.

Cancer related studies

Our scientists have conducted numerous studies on the effects of herbal extracts on cancer. These studies provide interesting information, which center on interesting topics in cancer research.

Essential oils

Essential oils of Icelandic Angelica archangelica seeds and Achillea millefolium were studied. In both cases great variability was found. Findings regarding Angelica archangelica seeds have been published (along with findings regarding their activity on cancer cells). Considerable activity was found in the essential oils of Icelandic Angelica archangelica. These findings (along with findings regarding the chemical structure of the essential oils in question) have been published in: Sigurdsson S, Ogmundsdottir HM, and Gudbjarnason S (2005) The cytotoxic effect of two chemotypes of essential oils from the fruits of Angelica archangelica L. Anticancer Res 25(3B): 1877-80

Furanocoumarins and tincture from seeds of the Icelandic Angelica archangelica

Activity of furanocoumarins xanthotoxin and imperatorin was also studied. Findings revealed considerable activity in the tincture (extract with 45% ethanol) and with imperatorin and xanthotoxin (50% reduction in cancer cell proliferation was observed at 2.7 and 3.7 µg/ml). Comparative analysis indicated that activity in the tincture could be solely traced to furanocoumarins. These findings have been published in: Sigurdsson S, Ogmundsdottir HM, and Gudbjarnason S (2004) Antiproliferative effect of Angelica archangelica fruits. Z Naturforsch 59c(7-8):523-7

Murine tumour growth

Water soluble contents of Icelandic Angelica archangelica leaves had suppressing effects on mice injected subcutaneously with Crl-cancer cells. Tumour formation was registered in all mice in the control group. Nine of the eleven mice, which received the infusion, had no tumour formation or developed smaller tumours than the smallest tumour of the control group. These findings have been published in: Sigurdsson S, Ogmundsdottir HM, Hallgrímsson J, and Gudbjarnason S (2005) Antitumour activity of Angelica archangelica leaf extract. In Vivo 19(1):191-4

Neurotransmitter related study

Significant inhibitory effects of herbal extracts on the activity of acetylcholinesterase was found in seeds of the Icelandic Angelica archangelica and in Geranium sylvaticum. The herbs had synergistic or compounding effects, meaning that a mixture of the two was more active than the sum of the two individual constituents. These findings have been published in: Sigurdsson S and Gudbjarnason S (2007) Inhibition of acetylcholinesterase by extracts and constituents from Angelica archangelica and Geranium sylvaticum. Z Naturforsch 62c: 689-693
Antitumour Activity of Angelica archangelica Leaf Extract

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Abstract. Background: The purpose of this study was to examine the effect of a leaf extract from A. archangelica on the growth of C14 mouse breast cancer cells in vitro and in vivo. Materials and Methods: The antiproliferative activity of the extract was measured by [3H]-thymidine uptake in the C14 cells in vitro. Twenty mice were injected with the C14 cells, and 11 of them were fed A. archangelica leaf extract, and the progress of the tumors was followed. Results: The leaf extract was mildly antiproliferative on the C14 cells with an EC50 of 87.6 μg/mL. The antitumour activity of the extract was expressed in the mice by marked reduction in tumour growth. In the experimental animals, 9 out of 11 mice developed no or very small tumours, whereas control animals, not receiving the extract, developed significantly larger tumours (p < 0.01), as estimated by Mann-Whitney U-test. The antitumour activity of the leaf extract could not be explained by the antiproliferative activity of furanocoumarins present in the extract. Conclusion: The results demonstrate the antiproliferative activity in vitro and antitumour activity in vivo of a leaf extract from A. archangelica.

Angelica archangelica or A. officinalis has been widely used in folk medicine and is one of the most respected medicinal herbs in northern countries, where it was cultivated during the Middle Ages (1,2). It grows wild in most parts of Iceland, where it and A. sylvestris are the only representatives of the genus Angelica (2). It was exported to central Europe during the Middle Ages (3).

The most characteristic secondary metabolites of A. archangelica are essential oils and furanocoumarins, both of which are more abundant in the roots and seeds than in the leaves. The whole plant has been used as a vegetable. In folk medicine A. archangelica has been used for respiratory catarrh, asthma, flatulent dyspepsia, anorexia nervosa, rheumatic diseases and peripheral vascular diseases (4).

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The bioactivity of coumarins, furanocoumarins and other constituents present in A. archangelica and in other species of the genus Angelica has been described previously. Inhibition of nitric oxide production has been demonstrated in a methanolic extract from A. megaphylla (5) and in polyacetylenes isolated from A. gigas (6). Polysaccharides from A. sinensis have been shown to protect against gastric damage (7), to promote healing of gastric ulcers (8,9) and prevent hepatic injury (10). Polysaccharides from A. sinensis, with gastric ulcer healing activity, have been shown to have an anti-angiogenic effect (9).

Coumarins isolated from the fruits of A. edulis have shown antitumour-promoting activity by inhibiting 12-O-tetradecanoylphorbol 13-acetate-stimulated 32P incorporation into phospholipids of cultured cells (11). The same activity has been observed in furanocoumarins and chalcones isolated from A. keiskei (12). Furthermore, in recent studies inhibition of growth and metastasis of Lewis lung carcinoma (LLC) implanted in mice has been demonstrated for extracts from A. keiskei (13), as well as for chalcone derivatives contained in it, specifically xanthoungelol (13) and 4-hydroxyderrin (14). The antiproliferative activity of extracts from A. japonica has been reported, as well as that of furanocoumarins isolated from it (15). Immunostimulating activity has been demonstrated for A. gigas (16) and antitumour activity has been described in immunostimulating polysaccharides from A. acutiloba (17) and A. sinensis (18). These studies were chiefly concerned with the roots of the plant.

The aim of this study was to evaluate the antiproliferative and antitumour activity of A. archangelica leaves. This is, to our knowledge, the first study of the antiproliferative and antitumour activity of the leaves of A. archangelica.

Materials and Methods

Preparation of tumour cells. C14 mouse breast cancer cells (American Type Culture Collection, Rockville, MD, USA) were cultured in RPMI-1640 medium with 10% foetal calf serum, 50 IU/mL penicillin, 50 μg/mL streptomycin, 0.01 M HEPES-buffer and 0.02 M L-glutamine (all from Gibco, Paisley, UK). The cultures were incubated at 37°C in 95% humidity and 5% CO2. The cells were trypsinized using a 1:30 dilution of standard Gibco trypsin-EDTA solution (Gibco), and washed
in RPMI 1640 medium. The tumour cells were then ready to be used in the experiments.

**In vitro assay.** The cells were trypsinized, counted and placed in 96-well plates at $10^4$ cells per well. The sample was added at the start, dissolved and serially diluted in water (extract) or 60% aqueous ethanol (xanthotoxin). In the case of xanthotoxin, the final ethanol concentration in all samples, including controls, was 3%. After 24-h culture, $^3$H-thymidine was added at 1 $\mu$Ci per well, and 4 h later the cells were washed, trypsinized and harvested in a Skatron Cell Harvester (Skatron Instruments, Lier, Norway) on to a TiterTek Filter Paper for Cell Harvester (Titertek Instruments, Huntsville, AL, USA). These were dried and the radioactivity was counted in a liquid scintillation counter (Tri-Carb, Packard, Boston, MA, USA) using Opti-Fluor (Packard) scintillation fluid.

**Food.** The control group was fed standard mouse diet, RM1 (Special Diet Services, Essex, England). Leaf extract was made by boiling 100 g leaf in 2 L water for 30 min, when the final volume was about 1600 mL. The dry weight of the extract was typically about 30 mg/mL. To each gram of the standard diet RM1, about 0.93 mL of extract was added. The pellets were allowed to dry before being stored in a refrigerator. Thus, each gram of food contained approximately 28 mg dry weight from the extract. The mice in the experimental group were fed the diet containing the leaf extract for 14 days preceding injection with tumour cells. Standard diet was fed to 10 mice, but the experimental group contained 11 mice.

Tumours. The female BALB/c mice were injected with 130,000 cells in 0.1 mL of the culture, subcutaneously in the flank. On the 31st day after the injection of tumour cells, the mice were sacrificed, and the tumours were excised with surrounding tissue and fixed immediately in formalin. After fixation, their diameters were measured. The overall gross form of the tumours was ellipsoid, and their volume was calculated accordingly using their 3 measured dimensions. Appropriate sections were taken for histological examinations, using Hematoxylin and Eosin stain.

**Results**

**Food consumption.** The food consumption was relatively constant in each group of mice during the experiment. There was no significant difference between the average food consumption of the control group (2.48 g/mouse/day) and the experimental group (2.76 g/mouse/day) receiving the leaf extract. There was no significant difference in weight gain either. These values allow for estimation of the consumption of the extract, the mice in the experimental group consuming on average 77 mg leaf extract daily.

Antiproliferative activity in vitro. The dose response curve is shown in Figure 1. The extract was diluted four-fold in each step, the concentration range of the extract being from 21 to
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possible synergism of flavonoids with chemotherapy agents (22) or other antiproliferative compounds such as furanocoumarins. Chalcone derivatives from the roots of A. keiskei have been shown to inhibit the growth of tumour implants in mice (13,14). At present, nothing is known of the presence or composition of chalcone derivatives in A. archangelica leaf.

Another possible explanation for the antitumour activity observed in this study is due to the polysaccharides present in the leaves. A polysaccharide fraction from A. acutiloba showed a potent antitumour activity against several forms of cancer (17,18). The active polysaccharide fraction showed anti-complement activity. The immunopharmacological characteristics of angelan, a polysaccharide from A. gigas Nakai, were investigated in relation to the specificity to immune cells (18). A polysaccharide from A. archangelica leaves showed anti-complement activity but this polysaccharide has not been characterized (data not included). It is possible that there is synergy between the antiproliferative activities of the furanocoumarins and flavonoids or polysaccharides that is responsible for the observed in vivo antitumour activity of the leaf extract.

Additionally, it is possible that the extract contains a compound that could prevent growth of new blood vessels (angiogenesis) in the tumour and thereby limit its size. Crude extracts from A. sinensis, which mainly consisted of polysaccharides, significantly promoted gastric ulcer healing in animal models. Angiogenesis was inhibited by treatment with the crude extract (9). The authors suggested that, since the crude extract could reduce angiogenesis, the extract might have an anti-angiogenic effect on tumour growth induced by chronic ulcers (9). Such polysaccharides in the leaves of A. archangelica might explain the antitumour activity observed in this study.

In conclusion, leaf extract from A. archangelica showed moderate antiproliferative activity against C12 mouse mammary carcinoma cells in vitro. This activity can partially be attributed to the xanthotoxin content of the extract. The formation of tumours in mice injected with C12 cells was significantly reduced in those fed pellets containing the extract.

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Clinical Study
**Clinical study**

**Effectiveness of SagaPro™**

From a parallel, randomized, double-blind, placebo-controlled clinical study on SagaPro, performed on men over the age of 45 suffering from lower urinary tract symptoms (LUTS) (N=69)

1. **Increase in bladder volume**
   per nocturnal void for subgroup with less than 260 ml volume initially

   ![Bar chart showing increase in bladder volume](chart)

   - **Placebo**
     - 16.3 ml
   - **SagaPro**
     - 44.3 ml

   Low bladder volume is directly related to urinary frequency.

   The SagaPro group had an increase in bladder volume of 44.3 milliliters.

2. **Reduction in nocturnal voids**
   for subgroup with more than 3 voids during standardized 8.7 hour night

   ![Bar chart showing reduction in voids per hour](chart)

   - **Placebo**
     - -0.07/hour
   - **SagaPro**
     - -0.18/hour

   A reduction in urinary frequency is important for proper sleep.

   The SagaPro group experienced a significant reduction in voiding frequency.

3. **Increase in duration of first sleep period**
   for subgroup 70 years or older and excluding those with sleep disorders

   ![Bar chart showing increase in sleep duration](chart)

   - **Placebo**
     - 36 min.
   - **SagaPro**
     - 101 min.

   The first sleep period at night is generally regarded as the most important one.

   The SagaPro group’s uninterrupted first sleep period increased by an average of 101 minutes during the treatment.

   * A "standard night" of 520 minutes was defined to harmonize different sleeping patterns.

   The study also confirmed that SagaPro is a safe and well-tolerated treatment

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