



# spruce

by Salvatore Battaglia

Norway Spruce: *Picea abies* L. Hemlock Spruce: *Tsuga canadensis* L.

Black Spruce: *Picea mariana* (Mill.) Britton White Spruce: *Picea glauca* (Moench) Voss

The tree is a symbol of an uncompromising will to live, endurance, strength, and a free spirit that refuses to conform or live in servitude... The oil awakens one's spirit and it is good for people who lack courage, perseverance, self-confidence and patience.<sup>1</sup>

Fischer-Rizzi is describing the characteristics of pine which I suggest also describes the qualities of spruce.

## Synonyms

Norway Spruce: Common spruce, European spruce

Hemlock Spruce: Eastern hemlock, hemlock

Black Spruce: Canadian black pine

White Spruce: Canadian spruce

## Family

Pinaceae

## Botany and origins

Spruce is a large evergreen tree up to 50m tall, also known as hemlock spruce. Spruce is native to the east coast of the USA. Arctander states that the oil is usually derived from several different botanical sources.<sup>2</sup> Tudge states that several

of the hemlocks epitomise the image of what a conifer tree should look like – tall, dark, and needle-leaved like spruces, however, the *T. canadensis* of eastern United States are smaller, slower growing and often cut into hedges.<sup>3</sup>

The word spruce originates from *spruse* which literally means 'from Prussia'.<sup>4</sup>

I found some excellent advice on telling the difference between fir, spruce and pine trees – look for the number of needles that come out of the same spot on a twig. If the twig bears needles in groups of two, three or five, then it's a pine. If the twig carries its needles singly, it's likely to be a fir or spruce. Pull off a needle and roll it between your fingers. If it feels flat and does not roll easily, it's fir. If the needle has four sides and it rolls easily between your fingers it's a spruce.<sup>5</sup>

## Method of extraction

Spruce essential oil is steam-distilled from the needles and twigs from several different botanical sources of spruce trees.

## Characteristics

Spruce oil is a pale yellow to colourless oil with a very pleasant, balsamic-fresh odour with a slightly fruity undertone. The odour characteristics can vary according to the origin of the oil and the botanical species used.<sup>2</sup>

## Chemical composition

The chemical composition of *T. canadensis* essential oil was reported as follows:

tricyclene (1.3%),  $\alpha$ -pinene (12.1%), camphene (13.4%),  $\beta$ -pinene (16.0%), limonene (12.0%),  $\beta$ -phellandrene (4.9%), p-cymene (0.1%), terpinolene (3.7%), p-cymenene (0.2%), bornyl acetate (37.6%), terpinen-4-ol (0.1%),  $\beta$ -caryophyllene (0.9%), citronellyl acetate (0.1%),  $\alpha$ -terpineol (0.6%), borneol (0.1%),  $\alpha$ -terpinyl acetate (0.1%), piperitone (0.6%), geranyl acetate (0.2%).<sup>6</sup>

The chemical composition of *Picea mariana* essential oil was reported as follows:

$\alpha$ -pinene (13.7%), camphene

(8.1%), limonene (5.2%), bornyl acetate (36.8%),  $\beta$ -pinene (14.2%), camphor (4.9%),  $\delta$ -3-carene (3.4%),  $\beta$ -myrcene (2.8%),  $\beta$ -phellandrene (2.1%), borneol (1.4%).<sup>7</sup>

## Adulteration

No information is available on possible adulteration of spruce oil. While adulteration may not occur, I can imagine that there may be challenges in obtaining spruce oil that is species pure. This is confirmed by Guenther who states that spruce oil is not usually derived from one single well-defined species of spruce, but from mixed branches and leaves of four different species of spruce. As no distinction is made in the collection of the distillation material the physicochemical properties of commercial spruce oil may vary significantly.<sup>8</sup>

## Herbal

*The British Herbal Pharmacopoeia* recommends an infusion or decoction of hemlock bark for the treatment of diarrhoea, cystitis, leucorrhoea, stomatitis and gingivitis.<sup>9</sup>

In the nineteenth century, the North American colonists made spruce beer, which was the tops of spruce infused in beer. Spruce beer was used as an antiscorbutic. The British Navel Surgeon James Lind, in 1753, had such high praise for spruce beer:

*The Newfoundland spruce beer, made of the black spruce, either fresh or dried, or from its essence, is an excellent medicine. The beer must be drunk daily, and parts affected with the eruption bathed with it night and day.*<sup>10</sup>

Captain James Cook used it to preserve the health of his crew and the prevention of scurvy.<sup>10</sup>

A 1905 book, *Curative foods from the cook; in place of drugs from the chemist*, noted that spruce beer made with the Norway spruce fir is an agreeable and wholesome beverage, very useful against scurvy and for chronic rheumatism.<sup>10</sup>

## Food, perfumery and flavouring

Spruce oil is extensively used in room fresheners, perfumes, bath products and household cleaning products.<sup>2</sup>

## Other uses

Spruce is one of the species most commonly used as a 'Christmas tree'.<sup>5</sup> Spruce is extensively used for its timber as a building material. In North America, it is commonly referred to by several different names such as North American timber and SPF lumber (a combination of spruces, pines and firs). All species yield a high-grade timber with relatively small tight knots. It is generally recommended for construction purposes for indoor use only.<sup>11</sup>

Pine lumber tends to be less expensive and more readily available than spruce lumber. While pine is weaker than spruce, it contains a higher amount of resin which ensures higher durability of the finished wood product. Spruce is often used for the manufacture of musical instruments such as guitars and violins.<sup>12</sup>

## Pharmacology and clinical studies

### Antimicrobial activity

The essential oil extracted from *P. abies* was found to have antimicrobial activity against a range of gram-positive bacteria and fungi.<sup>13</sup>

### Nootropic activity

An in vivo study found that treatment with black spruce oil enhanced memory function in rats and that the underlying mechanism of its action may be attributed to its acetylcholinesterase (AChE) inhibition activity.<sup>14</sup>

### Properties

Antimicrobial, antiseptic, antitussive, astringent, diaphoretic, diuretic, expectorant, nervine, rubefacient, tonic.<sup>15,16</sup>

### Aromatherapy Uses

There is a lack of clinical data for the therapeutic uses of spruce oil in aromatherapy; however, I am interested in Schnaubelt's comment regarding the chemical profile of many of the pine needle essential oils. He explains that they have a balance of stimulating monoterpene and calming esters. He states that they contain hormone-mimicking, polycyclic terpenoid compounds that are endocrine tonics, re-establishing hormonal balance in the pituitary, thyroid, adrenals and ovaries.<sup>17</sup>

Holmes states that while white spruce and black spruce have similar functions, only black spruce has the restorative action on the neuroendocrine-immune functions. White spruce has a higher monoterpene content that would make it more useful as a stimulating oil and an analgesic for aches and pains. He explains that white spruce acts as a stimulating expectorant with mucolytic action.<sup>18</sup>

It would be exciting to see research conducted to confirm the use of spruce oil as a tonic of neuroendocrine-immune system.

## Musculoskeletal system

Spruce oil is recommended for the relief of muscular aches and pain, poor circulation and rheumatism.<sup>15</sup>

## Psychological

Holmes recommends black spruce for mental fatigue and burnout. He suggests using it whenever one feels low motivation, low stamina and vitality and depression.<sup>18</sup>

Zeck beautifully describes the tonifying effect of spruce on our psyche:

*When suffering lingers too long and defeat and exhaustion pervade all areas of your life, refreshing aromatic spruce descends deep into the unlimited energy reserves that lie dormant within your being.*

*Like the warmth of a radiant sun upon your face, spruce activates the release of a healthy energy flow of energy from the adrenal glands to refresh and bring strength to each new day.*<sup>19</sup>

## Respiratory system

Spruce oil is very effective for the treatment of asthma, bronchitis, colds and flu, coughs and respiratory weakness.<sup>15</sup>

## Tonic

Schnaubelt notes that a number of pine needle oils have a balance of stimulating monoterpene and calming esters. He states that they are endocrine tonics, re-establishing hormonal balance in the pituitary, thyroid, adrenals and ovaries.<sup>17</sup>

## Energetics

According to the principles of TCM, spruce oil tonifies the *Qi* and *Yang* and strengthens the *Shen*.<sup>18</sup> Whenever our *Qi* and *Shen* is weak, we may experience fatigue and reoccurring infections, have low motivation and may suffer from depression.

Black spruce also tonifies the *protective Qi* which helps protect us from colds, influenza and reoccurring infections.<sup>18</sup>

Black spruce tonifies the *Lungs* and *Kidney Yang Qi*. Whenever we experience *Lung* and *Kidney Yang deficiency*, we may experience chronic cough, wheezing, chest pain, low stamina, mental and physical fatigue, backache and fearfulness.<sup>18</sup>

## Personality

I believe that there are many similarities in the characteristics of pine, fir and spruce. While Worwood is describing the personality of pine, I believe that it also applies to spruce.

Pine is recommended for persons who often feel responsible not just for their own actions but for the mistakes and suffering of others. Pine oil instils positivity and restores self-confidence, replacing undue guilt with forgiveness and self-acceptance.<sup>20</sup>

Worwood describes pine personalities as soft, gentle types who often go through life afraid to make a mistake. They can be self-critical and constantly apologising for everything and everyone. However, they also accept that anything will change and may not wish for change.<sup>20</sup>

She explains that like a good walk in the alpine forest, pine can help you make important decisions calmly and confidently. Pine personalities are never satisfied with themselves, their work and always blame themselves for not having tried harder. They are often workaholics who have forgotten how to play. They can have an incredible amount of energy.<sup>20</sup>

According to Myers-Briggs personality types, the spruce

personality is likely to be an INTJ. INTJs are very responsible and dependable. They are people of a very few words and tend to be private. They are punctual, precise and fastidious. They have the ability to concentrate and are difficult to distract. They prefer to work alone and dislike distractions. They are modest, unassuming and down to earth. They can be resistant to change. They can make quick critical judgements of others. They are extremely devoted in their relationships.

## Subtle

Spruce promotes communication of inner feelings. It is said to bring objectivity and clarity to the intuitive mind. Spruce teaches us to walk our spiritual path with 'practical feet', moving forward and making choices with grounded wisdom and intuitive understanding. Spruce supports intuition and teaches us about compassion – for ourselves and others. It will allow us to feel compassion despite our mistakes and fears.<sup>21</sup>

Lavabre states that spruce oil is excellent for balancing energy and recommends it for any type of psychic work because of its opening and elevating quality.<sup>16</sup>

Holmes states that inhaling black spruce oil evokes strength and endurance at the level of the soul. He describes the aroma as centering, strengthening and energising. It helps us find the inner strength whenever we need to face challenging situations. The oil will help us draw energy from the deeper wellspring of connected, deep inner strength and hope. It connects us to our collective past, our ancestral wisdom, becoming a source of deep and enduring strength for the future.<sup>18</sup>

## Blending

### Aromatherapy

For the relief of musculoskeletal conditions such as inflammation, tension and pain consider blending spruce with essential oils such as black pepper, ginger, kunzea, spike lavender, pine or rosemary.

For the relief of coughs and respiratory congestion consider blending with essential oils such as aniseed, cajeput, cypress, 1,8-cineole-rich eucalypts, fragonia, niaouli, pine and thyme.

To alleviate fatigue, lack of stamina, adrenal burnout and stress, consider blending spruce with essential oils such as bergamot, black pepper, ginger, lemon, galbanum, grapefruit, cold-pressed lime, pine, rosemary or vetiver.

Holmes recommends a blend of black spruce and scotch pine as a neuroendocrine-immune restorative tonic.<sup>18</sup>

### Perfumery

Spruce is excellent in 'fresh' perfume types. It blends well with all other pine oils and with oils that have a rich green note such as oakmoss absolute and galbanum. Spruce also blends well with herbaceous scents such as lavandin and rosemary.<sup>2</sup>

## How to use

### Bath

Full body bath, foot bath

### Topical

Compress, massage, ointment, skin care

### Inhalation

Direct inhalation, diffuser, oil vaporiser

### Safety

The overall composition of spruce oil means that it is safe and non-toxic essential oil. However, skin sensitisation may occur if the oil is oxidised, therefore, old or oxidised oil should not be used.<sup>7</sup>

## References

1. Fischer-Rizzi S. *Complete aromatherapy handbook*. Sterling Publishing, New York, 1990.
2. Arctander S. *Perfume and flavor materials of natural origins*. Allured Publishing, Carol Stream, 1994.
3. Tudge C. *The secret life of trees*. Allan Lane, London, 2005.
4. *Spruce In Online etymology dictionary*. Retrieved Sep 15, 2017, from [http://etymonline.com/index.php?allowed\\_in\\_frame=0&search=Spruce](http://etymonline.com/index.php?allowed_in_frame=0&search=Spruce)
5. Aitkens S. *Fir vs spruce vs. pine: How to tell them apart*. Retrieved Aug 12, 2018 from <https://www.finegardening.com/article/fir-vs-spruce-vs-pine-how-to-tell-them-apart>
6. Lawrence BM. *Progress in essential oils – Canadian hemlock oil*. *Perfumer & Flavorist*, 2009; 34: 59.
7. Tisserand R, Young R. *Essential oil safety*. 2nd edn. Churchill Livingstone, Edinburgh, 2014.
8. Guenther E. *The essential oil– Vol. VI*. Robert E. Krieger Publishing, Malabar, 1952.
9. *British herbal pharmacopoeia*. British Herbal Medicine Association, Bournemouth, 1983.
10. Crellin KK. *A social history of medicines in the twentieth century: to be taken three times a day*. Pharmaceutical Products Press, New York, 2004.
11. Canada Wood Group. *SPF products*. Retrieved November 11, 2017, from <http://canadawood.org/products/spf/>
12. *Pine vs. Spruce*. Retrieved 12 Aug 2018 from [http://www.softschools.com/difference/pine\\_vs\\_spruce/221/](http://www.softschools.com/difference/pine_vs_spruce/221/)
13. Radulescu V et al. *Chemical composition and antimicrobial activity of essential oil from shoots spruce (Picea abies L)*. *Revista de Chimie*, 2011; 62: 69-74.
14. Kharade P. *Screening of black spruce for nootropic activity in rats*. *PHD Thesis*. KLE University, Belagavi, Karnataka, 2015.
15. Lawless J. *The encyclopaedia of essential oils*. Element Books, Shaftesbury, 1992.
16. Lavabre M. *Aromatherapy workbook*. Healing Arts Press, Rochester, 1997.
17. Schnaubelt K. *Advanced aromatherapy*. Healing Arts Press, Rochester, 1995.
18. Holmes P. *Aromatica: a clinical guide to essential oil therapeutics –Vol. I*. Singing Dragon, London, 2016.
19. Zeck R. *The blossoming heart – aromatherapy for healing and transformation*. Aroma Tours, East Ivanhoe, 2004.
20. Worwood VA. *The fragrant mind*. Transworld Publishers, London, 1995.
21. Keim Loughran J, Bull R. *Aromatherapy and subtle energy techniques*. Frog, Berkeley, 2000.