

# Product specification for Watercress

**A traditional speciality guaranteed (TSG)**

Responsible country: Great Britain

**GB number: F0085**

## 1. Product name(s) to be registered

Watercress

## 2. Type of product (as in Annex XI)

Class 1.6. Fruit, vegetables and cereals fresh or processed

## 3. Grounds for registration

The product results from a mode of production, processing or composition corresponding to traditional practice for that product or foodstuff.

The name identifies the traditional character or specific character of the product.

### Explanation of the grounds for registration

Watercress using *Nasturtium Officinale* seeds has been grown in flowing water to a traditional production method used for over 200 years.

For centuries even before commercial production commenced in Europe over 200 years ago, the name “watercress” in the UK has been used to specify this variant of the cress family which is grown in flowing water. Cress is the plant name and water the descriptor.

## 4. Description

### 4.1. Product

Watercress with the botanical name *Nasturtium officinale* is an aquatic/semi aquatic plant which still grows wild in streams and springs throughout Europe, and also in many other countries in the world with a temperate climate. The plant remains anchored in position to the base or on the side of the stream or spring by its root system so as not to be washed away. The harvesting and selling of Watercress from the wild remains unaffected by this specification which only relates to commercial production.

Commercial production simply replicates how the plant grows in the wild, using the nutrients from the flowing water.

The botanical synonyms of *Nasturtium officinale* are *Rorippa nasturtium-aquaticum*, *Nasturtium nasturtium-aquaticum* and *Sisymbrium nasturtium-aquaticum* L. They reflect the true aquatic nature of the plant and how it grows.

The product presented to customers may vary in overall stem length, size of the leaves and in type of presentation and packaging.

The traditionally grown crop is harvested from water and is characterised by soft mid-green, moist leaves which have an unbroken edge and an oval shape. The stems are crisp, slightly paler in colour and can have some lateral roots extending from the joints of leaves to the stem.

#### **Microbiological properties:**

Derived from the environment in which the plant is grown; commercially grown in flowing spring water or boreholes the crop acquires an epiphytic microbial population characteristically high in benign *Pseudomonad* sp. The plant is grown in flowing water of high microbiological quality.

#### **Physical characteristics:**

Alternate, pinnately compound leaves with 3 to 11 oblong to oval leaflets, these are shiny, dark green, rounded at the tip, smooth without teeth or with wavy toothed margins. The colour is typically green (Hex triplet 008000) to dark green (Hex triplet 006400).

Creeping or floating stems which are succulent or fleshy

Smooth fibrous roots which allow rooting to occur anywhere along the submerged stem, primarily at the nodes.

The plant bears white flowers with 4 petals about 3mm to 5mm across, in terminal racemes and in racemes from the axils of the uppermost leaves. Small white and green flowers are produced in clusters. As part of the plants natural life cycle flowers occur during the early summer months when day length is approaching its maximum.

In comparison land cress is of the genus *Barbarea* Verna, produces single pinnately divided green leaves on a stem, and during the flowering period has yellow flowers. Land

ress is grown entirely on land rather than in flowing water, however it is not unusual for land cress to be marketed incorrectly as Watercress.

### **Chemical composition:**

When traditionally grown in flowing water Watercress is rich in glucosinolates in high expression of the glucosinolate B-phenylethyl glucosinolate which releases phenylethylisothiocyanate (PEITC) at a percentage of 10mg/100g FW. PEITC is released during chewing and is responsible for the characteristic pungent flavour. The peppery taste characteristic is due to the mustard oils inherent in the plant. Stress affects the levels of PEITC in the plant. If the crop is stressed through low or high temperature, or subject to water shortage the plant produces variant levels of PEITC.

### **Organoleptical properties:**

Comparative testing of Watercress against land grown cress have indicated that the colour of Watercress is darker/greener than land grown cress, it is significantly more peppery, and it has a softer texture.

A further sensory evaluation was conducted in 2009 also indicated that land grown cress had a weaker and less peppery flavour. Some comments were also recorded as to the water grown sample having darker leaves and a softer texture.

These two assessments demonstrated that on both occasions a professionally conducted evaluation of land versus flowing water grown crops identified differences, and when preference was sought, identified Watercress as superior – on organoleptic qualities alone.

Characteristically Watercress has a mustard after taste; it is peppery, hot and slightly bitter.

## **4.2 Production method**

Watercress must be grown in flowing water using *Nasturtium officinale* seed. However, seed may be sown on a suitable substrate in a propagation facility and the seedlings transferred to the production beds.

The crop can grow all year round in specially constructed beds. The temperature of flowing water which rises from natural springs or boreholes is typically between 10°C to 12°C which affords protection to the crop from hot and cold weather.

In order to have relatively uniform and consistent levels of PEITC (and therefore relatively uniform flavour) the crop needs stable, stress free growing conditions in terms of temperature, water supply and fertiliser. Having a water-based cultivation where constant flowing water is supplied throughout the life cycle of the plant is the ideal way to maintain temperature; the flowing water cooling the crop on hot days and warming it on cold days.

## **Water Supply:**

Traditionally the source of water has been from deep mineral rich natural springs or boreholes by either natural flows or pumped, however other sources are acceptable if of a suitably high microbiological quality (target zero Ecoli, tolerance, 100cfu /100ml; target zero listeria, tolerance 100cfu/100ml, zero Salmonella, zero STEC) and free from surface water contamination. The water must be tested at least four times a year to ensure it is of a quality appropriate to the production of a minimally processed food, meaning one that may be consumed without cooking.

Watercress produced in the UK must be grown in accordance with the Industry Guide to Good Hygiene practice for Watercress, which is recognised by the Foods Standards Agency.

## **Bed Design:**

The positioning of the production beds will usually be dictated by the source of water and the outlet. The production beds are constructed with impermeable sides, possibly on an incline from the point water enters the bed, and in such a way as to preclude surface water or run-off. Traditionally the incoming water is channelled and regulated into the individual beds by valves, taps or simple openings in the inlet carrier wall. More modern farming systems have been constructed in such a manner as to allow for automated supply systems from the water sources and for targeted temperature, water supply and fertilizer supply. Bed area varies depending on location and country. Surface or run-off water must not be allowed to enter the site. There must be no permanent muddy areas which could be a habitat for the mud snail.

## **Production Methods:**

A new crop should be established from seed to prevent the build-up of viruses, some of which are seed-borne. Seeds are either sown directly onto the bed bases, or more usually sown onto compost, or substrate material, in a propagation facility and raised to the first true leaf stage (approx. 3cm to 5cm high). Early summer cropping will require new crops from seed to overcome the natural flowering period which occurs at this time of year. During other months product can be harvested from re-growths, a process of allowing the harvested crop to regenerate into a new crop. Many growers produce their own seed by allowing some crop to flower and set seed, however seed is available from seed companies.

Direct seeding can be hand or machine spread onto the production beds, equally the seedlings produced in a propagation area can be planted by hand or machine, to achieve the appropriate densities over the bed base which is capable of retaining nutrient enriched moisture allowing for early root infiltration and anchorage.

Thereafter the incoming nutrient enhanced water is allowed to flow over the base whereby the crop derives the necessary minerals and trace elements essential for growth; the flow of water is increased as the crop matures to meet the needs of the crop.

Standard horticultural fertilisers with high phosphate content may be used to supplement the nutrients from the water and bed base and are applied as appropriate depending on crop requirements.

The crop must be grown in flowing water although their root systems may anchor to the edges.

### **Harvesting:**

Watercress is harvested for sale with or without roots or substrate and sold washed or unwashed. A bunched product is commonly characterised by pale stems stripped of leaf and root for 5cm to 6cm and held together by a rubber band or tie, above which the leaves, target 2cm to 5cm form the “head” of the bunch. However, there can be variations in the way the product is marketed, both in terms of the product itself (loose leaves, rosettes, with or without roots and/or substrate) and in terms of the packaging.

### **4.3. Key elements that establish character**

The traditional character of Watercress is enshrined in its production method and has been associated with flowing water for thousands of years; historically the crop has always been associated with aquatic production and has remained unaltered by selection and breeding in terms of morphology and flavour. Today it still looks identical to illustrations of the plant dating to Roman times.

Hippocrates, the founder of modern medicine is recorded to have chosen the site for the world’s first hospital, on the island of Kos, close to a stream suitable for cultivating the plant which he regarded as essential to the treatment of his patients. The Romans also grew Watercress in flowing water.

Nicholas Culpeper in his book Complete Herbal published in 1653 describes water cress as ‘growing in small rivulets of running water’.

The first commercial cultivation of Watercress took place in Germany in the mid-18th Century, whilst the crop was grown extensively in the clean, free-flowing streams of southern England during the early 1800s. It is a method of commercial production that has remained essentially unchanged, although the method of growing Watercress in flowing water dates back to Roman times. Production in France was described by Adophle Chatin in 1866 as ‘These ditches were an immense culture of Fountain Cresson, this culture was established for several years on water sources’

By the late 1800’s Watercress was a significant source of employment and revenue, the crop was being supplied to the major conurbations throughout northern Europe. As an example, in the UK the railway was extended to Alresford, Hampshire to carry upwards of 30 tonnes a week to the London markets. The restored steam railway is still known as “The Watercress Line” today.

There are several cinematic recordings from the 1930's showing Watercress growing in flowing water.

Watercress must be grown in flowing water. Pure spring waters rising from underground strata contain all the minerals needed for growth, however there is normally a lack of phosphorus. In northern Europe this was fortuitously available as a slow release phosphate fertiliser in the form of basic slag, a by-product of the traditional steel making process. For almost 200 years the crop was grown using pure spring waters supplemented by bed base applications of basic slag which supplied the phosphate fertiliser and trace elements the crop could not find in the flowing water. Today the steel making process has changed and basic slag is no longer available. Consequently, slow release commercial phosphate fertilizers are now used instead.

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