

Alternative crop factsheet: Nutraceutical crops

OPPORTUNITIES FOR NUTRACEUTICAL CROPS

Nutraceuticals are products that are used as pharmaceuticals, nutritional supplements, food additives or in alternative medicines and therapies. This can be in supplementary capsules, foods, drinks, or topical applications such as cosmetics and creams. Health claims of nutraceutical crops largely have inconclusive scientific evidence, compared to medicinal products, and are less regulated in terms of product claims, falling between food and pharmaceutical products. Crops possible to grow the South of Scotland are borage, echium, evening primrose, camelina and candula.

Evening primrose used for pharma and cosmetic purposes, and to enrich diet with essential oils – source of Gamma Linolenic Acid (GLA). Production in the UK largely replaced by borage due to being easier to grow and competition from production elsewhere, particularly China with cheaper labour and more suitable climate. Borage is similarly high in GLA and other fatty acids, and is sold as dietary supplement as well as for medicinal uses, such as heart diseases, asthma and arthritis. Echium is also a source of GLA, but also stearidonic acid which is rarer.

Camelina and calendula are both oilseeds, producing oil high in polyunsaturated fats and with uses in cosmetics, pharmaceuticals and painting and coating manufacture.

There is a wide range of markets, some more developed than others, for nutraceutical crops, including cosmetics, dietary supplements, phytotherapy and bioprocessing of natural oil-based materials. Most of this processing is currently located in the south of England.

After pressing for oil, the meal from some crops such as camelina may be suitable for use as animal feed, as it is high in protein and fibre, and a good alternative to soybean meal. Borage, however, contains anti-nutritive alkaloids which limits its use as a feed

It is highly recommended to grow for contract, as there is no established speculative market for nutraceutical crops. Markets for high GLA crops like echium have in the past been oversupplied with prices collapsing; because of this a limited number of contracts are offered, although the surplus has dropped in recent years with more contracts becoming available.

GROSS MARGINS

Camelina

Source: Agricultural Budget Costing, Nov 2019

Camelina	/ha
Yield (t/ha)	1.5
Price per tonne	£ 650
Output	£ 975
Seed	£ 120
Fertiliser	£ 110
Crop protection	£ 40
Sundries	£ 8
Variable costs	£ 278
Gross margin	£ 697

Borage

Source: Nix Pocketbook, 2019

Borage	/ha
Yield (t/ha)	0.4
Price per tonne	£ 2,650
Output	£ 1,060
Seed	£ 170
Fertiliser	£ 90
Sprays	£ 45
Variable costs	£ 305
Gross margin	£ 755



CROP ESTABLISHMENT AND PRODUCTION

LAND AND CLIMATE REQUIREMENTS

While more favourable oil profiles within borage are produced in cooler Northern latitudes, its cultivation north of mid Scotland is limited because of late harvests.

Camelina is drought tolerant and can be grown in a wide range of conditions. Field scale trials over a number of years in Scotland have indicated that it can be successfully cultivated with no notable agronomic problems.

High prices per ton of crops like borage and echium (£2,900/t and £3,600/t respectively), may offset lower yields; lower prices for camelina and candula may or may not do the same.

Oils from nutraceutical crops can be processed for food products, dietary supplements, cosmetics and paints, skin care products, and soaps and detergents.

CROPPING SYSTEMS

Borage is spring sown, conventionally at low densities, and is requires little fertiliser. As the crop matures it has a tenancy to shed seed and a pre-harvest treatment is required to even maturity and to minimise shedding.

Camelina is spring sown and established at a rate of around 7kg/ha, similar to oilseed rape. Like many of the other specialist crops described inputs are low. Establishment should be rapid, which will suppress weed growth. Like spring oilseed rape, treatment to control pollen beetle may be required, if these occur before flowers open.

HARVEST TIMING AND MACHINERY

Crops should be combined with care, using a conventional combine harvester, to avoid seed loss. As borage is sown at a low plant density, and produces relatively few branches, it can be difficult to achieve a suitably robust stubble platform to support the swath.

Camelina forms small seed pods which show good resistance to splitting and the crop can stand for a considerable period at maturity without seed loss. Swathing or desiccation may be carried out pre harvest, and direct cutting without a pre harvest treatment may also be possible in some situations. Camelina especially has extremely small seeds and care must be taken to avoid seed loss during handling.

PROCESSING AND SUPPLY CHAINS

- Contracts for borage have been offered for southern Scotland, and the crop has been grown commercially here. Currently production is limited to England, being closer to the sites of processing. As for the specialist oilseed rape types, contracts for borage production are based on the seed being removed from the farm and processing to take place centrally.
- It may be technically feasible to press borage seeds with a small scale cold press, however it should be recognised that cold presses are less efficient at extraction of oil than conventional large scale solvent extraction methods. Cold pressing will result in a lower oil yield, and since the oil is of very high value, this would seem to be a major disadvantage for small scale processing.
- The greater potential to utilise feed meal by-products may enhance viability of small scale processing. A challenge for successful processing on a farm scale may be the very small size of seeds, which would require careful setting to achieve satisfactory oil extraction.

Further information

- Agricultural Budget Costing Book
- Nix Pocketbook
- Commercial viability of alternative non food crops and biomass on Scottish Farms – a study by SAC Consulting, available online

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