

**TECHNICAL DATA SHEET**

VERSION FEBRUARY 2021

United Kingdom

 **OROBAC<sup>®</sup> 100**

**Biostimulant for soil applications**

**Product Category**

Biostimulant

**Use Category**

Professional

**Formulation Type**

Suspension Concentrate(SC)

**Active substance/content**

2 x 10<sup>9</sup> CFU/ml (2 billion CFU/ml)

2 strains of *Bacillus licheniformis*

2 strains of *Brevibacillus laterosporus*

1 strain of *Bacillus amyloliquefaciens*

## General information and key benefits

OROBAC<sup>™</sup> 100 is a highly concentrated mixture of 5 strains of non-GMO, soilborne, naturally occurring plant growth promoting rhizobacteria (PGPR) spores produced and formulated using a commercial scale fermentation facility.

The *Bacillus* spp. in OROBAC 100 are able to significantly improve the uptake of plant nutrients including nitrogen, phosphate, potassium, calcium, magnesium and micro elements. It will free up nutrients, like phosphorus, bound to soil particles and crop residues to a form that is more readily usable by plants. This has been proven in various statistical trials.

In addition, OROBAC 100 produces phytohormones stimulating root growth for enhanced nutrient uptake, fostering the growth of a robust beneficial microbial colony in the soil, leading to improved tolerance to abiotic stress conditions. OROBAC 100 has been shown to be able to increase plants resistance against many phytopathogenic

organisms.

Microbes applied to soils with a high soil organic carbon (SOC) content will multiply and remain active for many years. However, if the soil is exposed as a result of being turned over during ploughing, the microbial population will be reduced. Hence OROBAC should be applied every season to fields with annual crops. Similarly, regular applications on soils with low SOC are necessary.

Conventional agricultural practices unfortunately often have a negative effect on the microbial population and regular OROBAC application will help to restore the balance.

The spores are not very sensitive to UV radiation although it is not desirable to leave an opened product container in the sun for an extended period.

## Mode of action

The PGPR *Bacillus* spp. within OROBAC 100 are endospores (extremely resistant, dormant cell structures) that are activated by the plant exudates in the rhizosphere and germinate to grow out into fully functioning cells. These produce a wide variety of extra-cellular enzymes such as amylase, cellulase, protease, urease, xylanase, etc. which mineralize inorganic nutrients and convert carbon substrate into plant available forms.

The rhizosphere is a rich source of plant exudates such as sugar, amino acids, fatty acids, etc. The rhizobacteria utilize them as a source of carbon and energy and in turn,

promote and protect plant growth. This results in increased vigour, faster germination, greater root system development and consequently, increased yield.

The PGPR *Bacillus* spp. also produce a wide range of phytohormones which coordinate cellular activities, such as indole acetic acid (IAA), cytokinins, auxins, gibberellins and abscisic acid.

The PGPR within OROBAC 100 grow in the roots of plants and protect the host plant by activating the inherent immune system of the plant.

## Application rate and timing

Crop	Dosage	Timing	Placement
Row crops and cereals	1L/ha	At planting	In furrow as close to the seed as possible
Vegetables	2 x 1 L/ha	At planting	In furrow close to the seed or transplant roots
		One month later	Via fertigation system in shallow irrigation to target active root zone
Tree crops	3 x 1 L/ha	At first root flush	Via fertigation in shallow irrigation to target active root zone
		Mid spring	
		Late spring	
Vines & berries	3 x 1 L/ha	Budburst	Via fertigation in shallow irrigation to target active root zone
		20 cm shoot growth	
		Flowering	
Ornamental plants	2 x 1 L/ha	At planting	In furrow close to the seed or transplant roots.
		One month later	Via fertigation system in shallow irrigation to target active root zone
Potatoes	2X500ml/ha	At planting	In furrow close to the seed.
		One month later	Via fertigation system in shallow irrigation to target active root zone

## Mode of application

OROBAC is in spore form and can be mixed and applied with most common liquid planting fertilisers without problem. However, do not leave the mixture standing in the tank overnight. If planting with solid fertiliser, it is best to apply OROBAC in the furrow via a liquid inoculation tank on the planter.

Alternatively, application can be made by making a suspension in a separate tank and applying it through the irrigation system.

Also boom application can be made. Product landing on foliage will not do any damage to the leaves but will be inactivated due to the exposure to the sun.

OROBAC should be applied to the soil with sufficient water to allow it to soak in.

The formulated product contains spores of the *Bacillus* spp. which are very resistant structures, so the risk of being damaged by other agricultural products is really low.

## Classification

- P102: Keep out of reach of children.
- P103: Read label before use.

## Phytotoxicity

**OROBAC 100** showed no phytotoxicity at doses and recommendations indicated on the label. In view of the continuing introduction of new varieties of vegetables and crops, it is nevertheless desirable to evaluate the effect of **OROBAC 100** on small surfaces before applying on large scale.

## Further recommendations

- Agitate content well before use as natural settling of spores may occur. Stir the content of the tank before application.
- OROBAC 100 should be applied directly in furrow or with irrigation water.
- OROBAC is in spore form and can be mixed and applied with most common liquid planting fertilisers without problem. However, do not leave the mixture standing in the tank overnight. If planting with solid fertiliser, it is best to apply OROBAC in the furrow via a liquid inoculation tank on the planter.
- Do not exceed the recommended application rates.
- OROBAC 100 can be applied by direct boom sprayer onto the berm in an orchard situation but should be washed in by micro- or overhead irrigation shortly after application.
- OROBAC 100 requires a minimum of about 6 hours after application in order to colonize the roots. Avoid heavy irrigation for 1-2 days after application to allow time for root colonization.
- Where possible, apply OROBAC 100 separately. Nevertheless, OROBAC 100 is compatible with most fertilizers and plant protection products. Once mixed with other products, it should be applied within 4 to 6 hours. Spore counts start to decrease at a pH below 2. **DO NOT MIX** with Copper fungicides.
- OROBAC 100 should not be applied before soil fumigation. Apply at least 15 days after fumigation.
- This formulation is for soil application – not recommended for foliar application.

## Storage conditions & shelf life

- No special precautions are necessary during storage.
- **OROBAC 100** is an endospore based microbial product and there is no need for refrigeration if sealed. If stored in cool ambient temperatures and dry conditions (Preferably between 4-30 °C), shelf-life of 18 months from manufacturing date can be expected. Use complete contents as soon as possible after opening, to avoid deterioration and contamination.

**For further information please check the OROBAC 100 safety data sheet (SDS). Feel free to contact a local ORO AGRI representative.**

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