Kelpak Technical Data

CONTENTS

KELPAK OVERVIEW

THE EFFECT OF KELPAK ON FRUIT SET

THE BENEFITS AND APPLICATION OF KELPAK ON:

CANOLA | OILSEED RAPE
CEREALS
CUCURBITS
FLOWERS | ORNAMENTAL PLANTS
LEAFY VEGETABLES
POTATOES
RICE
TABLE GRAPES
TOMATOES METRIC
TOMATOES IMPERIAL
liquid seaweed concentrate
THE GLOBAL LEADER IN AUXIN BASED SEAWEED PRODUCTS FOR OVER THIRTY YEARS

Source Fresh *Ecklonia maxima* seaweed high in natural auxins

Harvesting Strip rotation ensures uniform age and consistent biological activity

Process Unique cold cellular burst extraction maintains auxin dominance

Activity Auxin:cytokinin ratio
> 300:1 promotes prolific lateral root development

**KELPAK BENEFITS**

- Increase in root tips improves:
  - plant nutrient and water uptake,
  - natural cytokinin production and subsequent foliar growth
- Reduces transplant shock
- Increases growth of seedlings and nursery plantouts
- Reduces herbicide stress and damage to row crops
- Increases photosynthesis and carbohydrate production
- Increases fruit set and fruit retention
- Increases fruit number, size, colour and sugar content
- Increased yields with better returns
- Improves shelf-life and produce quality during cold storage
- Kelpak organic approved formulation available (IMO/BCS)

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops
KELPAK APPLICATION
- Seed coating
- Root dip
- Soil drench
- Drip irrigation
- Foliar spray (conventional, electrostatic or aerial)

OPTIMAL USAGE
- Do not dilute more than 1:500
- Do not over dilute with drip irrigation application
- Apply as a pulse during last 10 minutes of irrigation cycle
- Maintain pH below 7
- Do not apply more frequently than 14 days apart
- Do not apply as tank-mix with cytokinin-based products
- Compatible with most agrochemicals

DROP FOR DROP THE MOST EFFECTIVE BIOSTIMULANT

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
Flowers and pollen grains with low auxin levels have poor pollen tube growth, leading to poor fertilization and fruit set.

Application of an auxin dominant product such as Kelpak will increase auxin levels in flowers resulting in better pollen tube development and growth, with better fertilization and fruit set.

Boron deficiency in floral parts will stimulate the activity of the enzyme indole acetic acid (IAA) oxidase. This enzyme causes the natural break-down of auxins leading to lower auxin levels in floral parts. Correction of Boron deficiency levels will inhibit IAA oxidase and prevent the break-down of auxins present in floral parts.

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops.

The global leader in auxin based seaweed products for over thirty years.
The effects of boron on fruit set

**Low auxins**
- Poor pollen tube elongation
- Poor fertilisation
- Poor fruit set
- Low yield

**High auxin level**
- Improved yield
- Better fruit set
- Better fertilisation
- Auxins promote optimum pollen tube elongation

**Boron deficiency** = Poor fruit set

**Recommendation to improve fruit set:**

**Kelpak foliar application:**
Apply Kelpak from balloon stage to fruit set stage. Repeat once or twice at 10 to 12 day intervals

**Application rate:**
3 L/ha / 3 pt/A (0.3% minimum)
Apply with standard Boron sprays for optimum effect

**Caution:**
Do not apply Boron where Boron toxicity can occur

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
• Improves root development
• Rapid establishment of rosette helps protect growth tip against environmental pressures
• Autumn application in northern hemisphere improves winter hardiness
• Significantly increases seed and oil yield

Kelpak, a natural biostimulator extracted from freshly harvested Ecklonia maxima kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years
DROP FOR DROP, THE MOST EFFECTIVE BIOSTIMULANT

Control
Kelpak

RECOMMENDED APPLICATION RATE

Southern Hemisphere
2-3 L/ha foliar at the 3 to 4-leaf stage (BBCH 13-14)

Northern Hemisphere
2 x 2 L/ha foliar in autumn (BBCH 13-14) and at start of spring growth – rosette stage (BBCH 28-30)
or
3 L/ha at start of spring growth - rosette stage (BBCH 28-30)

<table>
<thead>
<tr>
<th>CROP</th>
<th>Variety</th>
<th>Country</th>
<th>KELPAK (L/Ha)</th>
<th>Timing</th>
<th>Yield increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canola</td>
<td>Monty</td>
<td>RSA</td>
<td>2</td>
<td>BBCH 14-16</td>
<td>9</td>
</tr>
<tr>
<td>Canola</td>
<td>Dunkeld</td>
<td>RSA</td>
<td>2</td>
<td>BBCH 13</td>
<td>11</td>
</tr>
<tr>
<td>Canola</td>
<td>Monty</td>
<td>RSA</td>
<td>2</td>
<td>BBCH 13</td>
<td>19</td>
</tr>
<tr>
<td>Canola</td>
<td>Bravo</td>
<td>Australia</td>
<td>2</td>
<td>BBCH 14-16</td>
<td>15</td>
</tr>
<tr>
<td>OSR</td>
<td>Helga</td>
<td>Hungary</td>
<td>3</td>
<td>BBCH 50</td>
<td>21</td>
</tr>
<tr>
<td>OSR</td>
<td>Valesca</td>
<td>Hungary</td>
<td>3</td>
<td>BBCH 65</td>
<td>28</td>
</tr>
<tr>
<td>OSR</td>
<td>Lirajet</td>
<td>Poland</td>
<td>2</td>
<td>BBCH 28-30</td>
<td>42</td>
</tr>
<tr>
<td>OSR</td>
<td>Lisek</td>
<td>Poland</td>
<td>3</td>
<td>BBCH 28-30</td>
<td>29</td>
</tr>
<tr>
<td>OSR</td>
<td>Kontakt</td>
<td>Poland</td>
<td>3</td>
<td>BBCH 28-30</td>
<td>35</td>
</tr>
<tr>
<td>OSR</td>
<td>Sylvia</td>
<td>Poland</td>
<td>3</td>
<td>BBCH 28-30</td>
<td>40</td>
</tr>
<tr>
<td>OSR*</td>
<td>Galileo</td>
<td>Poland</td>
<td>2</td>
<td>BBCH 14</td>
<td>18</td>
</tr>
<tr>
<td>OSR*</td>
<td>Galileo</td>
<td>Poland</td>
<td>2</td>
<td>BBCH 30</td>
<td>6</td>
</tr>
<tr>
<td>OSR*</td>
<td>Galileo</td>
<td>Poland</td>
<td>2 + 2</td>
<td>BBCH 14 + 30</td>
<td>18</td>
</tr>
<tr>
<td>OSR</td>
<td>Pioneer W31</td>
<td>Germany</td>
<td>2</td>
<td>Spring</td>
<td>25</td>
</tr>
<tr>
<td>OSR*</td>
<td>Athoga</td>
<td>Germany</td>
<td>2 + 2</td>
<td>Autumn+Spring</td>
<td>7</td>
</tr>
<tr>
<td>OSR*</td>
<td>Ladoga</td>
<td>Germany</td>
<td>2</td>
<td>Autumn</td>
<td>6</td>
</tr>
<tr>
<td>OSR*</td>
<td>Visby</td>
<td>Germany</td>
<td>2</td>
<td>Spring</td>
<td>4</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18%</td>
</tr>
</tbody>
</table>

* Ultra high yielding crops

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
cereal crops

• Increases vigour of root and shoot growth
• Improves nutrient uptake
• Increases culm diameter and reduces lodging
• Improves resistance during drought conditions
• Produces higher quality grain and yields

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of cereals. The global leader in auxin based seaweed products for over thirty years.
RECOMMENDED APPLICATION RATE

Barley
2.0L per ha Spray at 4 to 5-leaf stage

Maize
2.0L per ha Spray at 4 to 5-leaf stage

Wheat
2.0L per ha Spray at 4 to 5-leaf stage

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
cucurbit crops

- Reduces transplant shock
- Increases vigour of root and shoot growth
- More and larger fruit per plant
- Increases fruit sugar levels and shelf-life
- Higher returns per hectare

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years.
**Cucurbit trials – California**

<table>
<thead>
<tr>
<th>Cucumber</th>
<th>Seedless watermelon</th>
<th>Seedless watermelon</th>
<th>Pumpkins</th>
<th>Cantaloupe</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL</td>
<td>40%</td>
<td>21%</td>
<td>16%</td>
<td>26%</td>
</tr>
</tbody>
</table>

**Cucurbit trials – South Africa**

<table>
<thead>
<tr>
<th>Cucumber</th>
<th>Pumpkin</th>
<th>Butternut</th>
<th>Cantaloupe</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL</td>
<td>26%</td>
<td>37%</td>
<td>34%</td>
</tr>
</tbody>
</table>

**RECOMMENDED APPLICATION RATE**

**Transplants**

Dip the seedlings in seedling tray in 1% Kelpak or water trays directly before transplanting.

Follow up with a 2 to 3 L/ha Kelpak foliar spray 14 days later and repeat the foliar spray 14 – 21 days later.

**Direct seeding**

Apply Kelpak as a foliar spray at 2 to 3 L/ha at the 3 to 4-leaf stage and repeat the foliar application twice at 14 day intervals.

The use of a standard surfactant is recommended, while pH of spray solution should be below 7.

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090.
ornamental plants

- Reduces transplant shock
- Improved root development
- Improved nutrient and moisture absorption
- Increase in foliar growth
- Greater resistance to disease and stress
- Longer flower stems
- Higher flower production

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of flowers. The global leader in auxin based seaweed products for over thirty years.
RECOMMENDED APPLICATION RATE

Flowering and Ornamental Plants

1:100 dilution Dip or wet seedling tray or seedling bags with solution before transplant.

1:400 dilution Spray 14 days after transplant and repeat 2 to 3 times at 21 to 28 day intervals.

Roses

New Planting

1:500 dilution Drench at 1 L per m² flower bed. Repeat drench 15 days later. Apply at 1:400 dilution as foliar spray 15 days after second drench.

Enclosed Production

1:500 dilution Drench at 1 L per m² flower bed after pinching. Repeat drench 15 days later. Apply at 1:400 dilution as foliar spray 15 days after second drench.

Open Production

1:400 dilution Apply as foliar spray. Repeat 14 days after first application. Repeat at 6 monthly intervals.

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
leafy vegetables

- Reduces transplant shock
- Increases vigour of root and shoot growth
- Improves nutrient uptake
- Increases resistance to drought and waterlogged conditions
- Improved size and higher yields

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years.
RECOMMENDED APPLICATION RATE

Dip the seedling tray roots or roots of plants from seedbed in a 1:100 dilution before plant-out and Spray 2 - 3 L/ha 14 days after plant-out and repeat once or twice at 14 day intervals. Do not spray after button formation.

Start with foliar application at 3 to 4-leaf stage for direct seeded crops.

Kelp can be applied in mixes with other pesticides and foliar nutrients, but pH of spray solution should be below 7 for optimum results.

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
potatoes

- Increases vigour of root and shoot growth
- Improves nutrient uptake
- Increases resistance to nematode infestation
- Increases resistance during drought and waterlogged conditions
- Increases tuber number, size and total marketable yield

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years
RECOMMENDED APPLICATION RATE

1:300 dilution Dip seed potatoes before planting for approximately 5 minutes
or
1 L/ha Spray with fungicide on seeds in furrow with planting

2 – 4 L/ha Spray after emergence at 15 cm crown diameter

2 L/ha Spray again 12 to 14 days after first foliar application

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years.
RECOMMENDED USE ON RICE

For improved germination, initial root growth:
1:400 Kelpak dilution with sanitary seed soak

For improved yield and quality:
First foliar spray of 2 L/ha at start of tillering (± 25 days after emergence or ± 15 days after transplant). Repeat foliar application of 1 - 2 L/ha at start of panicle initiation

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Variety</th>
<th>Region</th>
<th>Treatment</th>
<th>Yield increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Sasanishi</td>
<td>Miyagui Japan</td>
<td>20 d before culm emerge (0.2% spray)</td>
<td>+15%</td>
</tr>
<tr>
<td>1991</td>
<td>Akitakomachi</td>
<td>Akita Japan</td>
<td>3 d pre-transplant* and 35 d post-transplant (0.2% spray)</td>
<td>+16%</td>
</tr>
<tr>
<td>1991</td>
<td>Akitakomachi</td>
<td>Iwate Japan</td>
<td>3 d pre-transplant* and 27 d post-transplant (0.2% spray)</td>
<td>+11%</td>
</tr>
<tr>
<td>1998</td>
<td>Sasanishi</td>
<td>Tokyo Japan</td>
<td>Pre-transplant* and post-transplant (0.2% spray)</td>
<td>+13%</td>
</tr>
<tr>
<td>2001</td>
<td>IET-4787</td>
<td>East India</td>
<td>3 d pre- and 15 d post-transplant (1.5 L/ha)</td>
<td>+8%</td>
</tr>
<tr>
<td>2001</td>
<td>MTU 1001</td>
<td>South India</td>
<td>3 d pre- and 15 d post-transplant (2 L/ha)</td>
<td>+5%</td>
</tr>
<tr>
<td>2002</td>
<td>Padi</td>
<td>Sg Besar Malaysia</td>
<td>Seed soak (0.2%); 14 d after sowing (2 L/ha)</td>
<td>Better germination +12%</td>
</tr>
<tr>
<td>2003</td>
<td>Padi</td>
<td>Mekong Vietnam</td>
<td>Spray 7 and 15 d after sowing (0.25%) (2 trials)</td>
<td>+10%</td>
</tr>
<tr>
<td>2003</td>
<td>INIAP 14</td>
<td>Vainillos Ecuador</td>
<td>Spray 25 d after seeding (2 L/ha)</td>
<td>+17%</td>
</tr>
<tr>
<td>2004</td>
<td>M202</td>
<td>Sacramento California</td>
<td>Seed soak (0.3%); Spray 24 d after seeding (2 L/ha)</td>
<td>+9%</td>
</tr>
<tr>
<td>2006</td>
<td>IR-43</td>
<td>Jequetepeque Peru</td>
<td>Spray 18 d after plantout (2 L/ha)</td>
<td>+12%</td>
</tr>
<tr>
<td>2010</td>
<td>IR-43</td>
<td>Chiclayo Peru</td>
<td>Spray start of tiller (2 L/ha); Start of panicle emergence (1 L/ha)</td>
<td>+18% +23%</td>
</tr>
<tr>
<td>2010</td>
<td>IR-43</td>
<td>Chiclayo Peru</td>
<td>Spray start of tiller (2 L/ha); Start of panicle emergence (1 L/ha)</td>
<td>+15% +23%</td>
</tr>
</tbody>
</table>

Average rice yield increase (14 trials) +15%

* Seed bed soak with 0.1 - 0.2% Kelpak

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
table grapes

- Increases vigour of root and shoot growth
- Bunch elongation (stretching)
- Increases berry size
- Increases number of export quality bunches
- Enhances bunch colour at harvest
- Often improves fruit sugar levels at harvest
- Increases returns

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years.
**Kelpak on berry size – Chile**

% Increase above control

- **Flame**: 6%
- **Thompson**: 11%
- **Red Globe**: 16%
- **Superior**: 5%
- **Crimson**: 10%

**Quality improvement on grapes - South Africa**

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>RETURN INCREASE</th>
<th>EXPORT PACKOUT INCREASE</th>
<th>EXPORT COLOUR INCREASE</th>
<th>TSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thompson</td>
<td>+ 9%</td>
<td>+ 3%</td>
<td>-</td>
<td>+ 7%</td>
</tr>
<tr>
<td>Flame Seedless</td>
<td>+ 17%</td>
<td>+ 6%</td>
<td>+ 19%</td>
<td>+ 4%</td>
</tr>
<tr>
<td>Red Globe</td>
<td>+ 16%</td>
<td>+ 11%</td>
<td>+ 28%</td>
<td>+ 8%</td>
</tr>
<tr>
<td>Crimson Seedless</td>
<td>+ 17%</td>
<td>+ 6%</td>
<td>+ 5%</td>
<td>-</td>
</tr>
<tr>
<td>Superior Seedless</td>
<td>+ 12%</td>
<td>+ 5%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prime Seedless</td>
<td>+ 12%</td>
<td>+ 10%</td>
<td>-</td>
<td>+ 4%</td>
</tr>
<tr>
<td>Dan-ben-Hannah</td>
<td>+ 5%</td>
<td>+ 11%</td>
<td>+ 11%</td>
<td>-</td>
</tr>
<tr>
<td>Dauphine</td>
<td>+ 8%</td>
<td>+ 7%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sunred Seedless</td>
<td>+ 6%</td>
<td>+ 2%</td>
<td>+ 7%</td>
<td>-</td>
</tr>
</tbody>
</table>

Foliar sprays sometimes replaced by directed bunch applications.

**For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090**
tomatoes

- Reduces transplant shock
- Increases vigour of root and shoot growth
- Improves resistance to nematode infestation
- Increases fruit size and number, and total yield
- Produces higher early harvest yields
- Increases shelf-life of fruit by up to 1 week

Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of crops. The global leader in auxin based seaweed products for over thirty years.
RECOMMENDED APPLICATION RATE

Dip the roots of seedlings (or seedling tray) in 1% Kelpak before transplanting into the field or greenhouse

Follow up with a 2 L/ha Kelpak foliar spray 14 days later and repeat the foliar spray once or twice at 14 day intervals

Spray direct seeded crops at 3 to 4-leaf stage and repeat once or twice at 14 day intervals

Alternatively to seedling dip at plant-out, Kelpak may be applied at 7 L/ha as a pulse through drippers after transplanting. Rinse lines after pulse

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090
**Kelpak on Tomatoes**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>TYPE</th>
<th>RATE (pt/A)</th>
<th>APPLICATION</th>
<th>AVE YIELD INCREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>Processing</td>
<td>1.0% 2 – 2.5 pt/A x 2</td>
<td>Dip/drench</td>
<td>10%</td>
</tr>
<tr>
<td>Chile</td>
<td>Greenhouse</td>
<td>1.0% 0.5% x 3</td>
<td>Dip/drench Foliar sprays</td>
<td>23%</td>
</tr>
<tr>
<td>Hungary</td>
<td>Field</td>
<td>1.0% 2 pt/A x 2</td>
<td>Dip Foliar sprays</td>
<td>21%*</td>
</tr>
<tr>
<td>Philippines</td>
<td>Field</td>
<td>1.0% 2 pt/A x 3</td>
<td>Dip Foliar sprays</td>
<td>31%</td>
</tr>
<tr>
<td>Poland</td>
<td>Field</td>
<td>2 pt/A x 3</td>
<td>Foliar sprays</td>
<td>7%</td>
</tr>
<tr>
<td>South Africa</td>
<td>Greenhouse &amp; Field</td>
<td>1.0% 2 pt/A x 3 - 5</td>
<td>Dip/drench Foliar sprays</td>
<td>23%</td>
</tr>
<tr>
<td>Spain</td>
<td>Greenhouse</td>
<td>7 pt/A x 1</td>
<td>Drip after plant</td>
<td>70%*</td>
</tr>
</tbody>
</table>

* Yield of first 3 pickings

---

**Shelf-life of tomatoes treated with Kelpak**

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>IMPROVED SHELF-LIFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x foliar</td>
<td>+ 5 days</td>
</tr>
<tr>
<td>5 x foliar</td>
<td>+ 7 days</td>
</tr>
<tr>
<td>Soil drench</td>
<td>+ 6 days</td>
</tr>
<tr>
<td>Dip + 3 x foliar</td>
<td>+10 days</td>
</tr>
</tbody>
</table>

---

**RECOMMENDED APPLICATION RATE**

Dip the roots of seedlings (or seedling tray) in 2 pts Kelpak per 25 gal water before transplanting into the field or greenhouse.

Follow up with a 2 pt/A Kelpak foliar spray 14 days later and repeat the foliar spray once or twice at 14 day intervals.

Spray direct seeded crops at 3 to 4-leaf stage and repeat once or twice at 14 day intervals.

Alternatively to seedling dip at plant-out, Kelpak may be applied at 7 pt/A as a pulse through drippers after transplanting. Rinse lines after pulse.

---

For more information visit our website www.kelpak.com, email info@kelpak.com or call us on +27 (0) 21 786 2090.