

Kelpak Technical Data



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FLOWERS | ORNAMENTAL PLANTS

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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



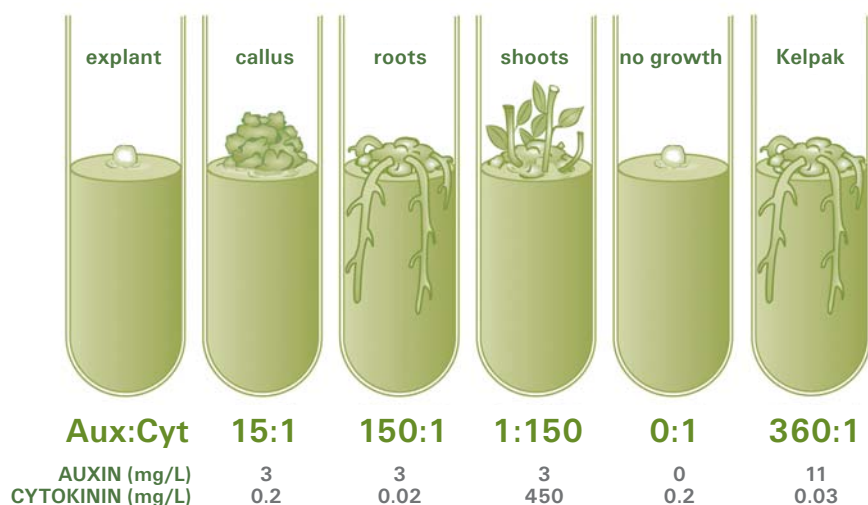
KELPAK BENEFITS

- 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

AUXIN DOMINANCE PROMOTES ROOTING



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**



fruit set

THE IMPORTANCE OF AUXINS AND BORON IN FRUIT SET



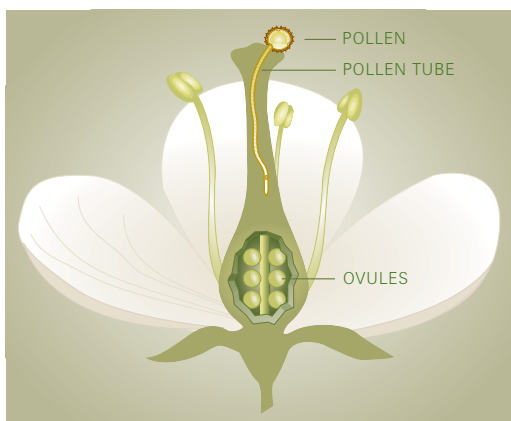
Flowers and pollen grains with low auxin levels have poor pollen tube growth, leading to poor fertilization and fruit set.

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.

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THE EFFECTS OF AUXINS ON FRUIT SET



LOW AUXINS

POOR POLLEN TUBE
ELONGATION

POOR FERTILISATION

POOR FRUIT SET

LOW YIELD



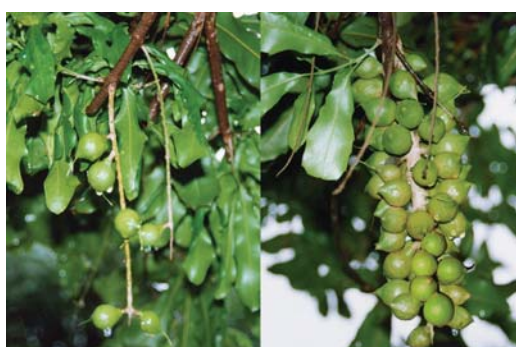
HIGH AUXIN LEVEL

IMPROVED YIELD

BETTER FRUIT SET

BETTER FERTILISATION

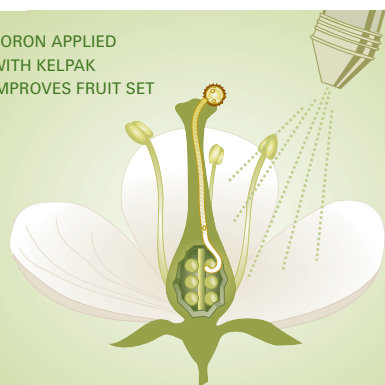
AUXINS PROMOTE
OPTIMUM POLLEN
TUBE ELONGATION



Effect of Kelpak
application on fruit set
in macadamias, Kelpak
treatment right and
standard practice left

THE EFFECTS OF BORON ON FRUIT SET

BORON APPLIED
WITH KELPAK
IMPROVES FRUIT SET



BORON

INHIBITS INDOLE
ACETIC ACID
OXIDASE ENZYME
THAT BREAKS
DOWN AUXINS

LESS IAA OXIDASE

MORE AUXINS

BORON DEFICIENCY=
POOR FRUIT SET



**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

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

canola [oilseed rape]



- 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



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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)



Effect of Kelpak rate and timing on canola and oilseed rape (OSR) crops

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

* Ultra high yielding crops

KELPAK

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**

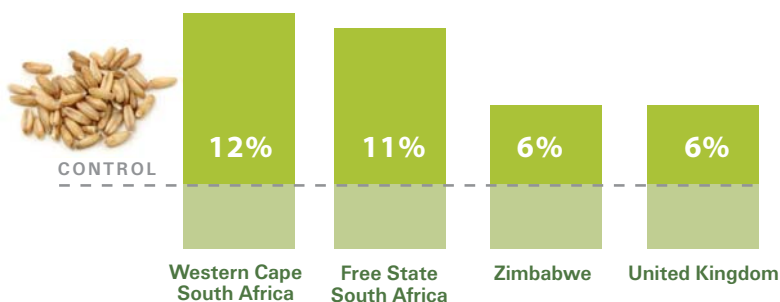


Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of cereals. The global leader in auxin based seaweed products for over thirty years



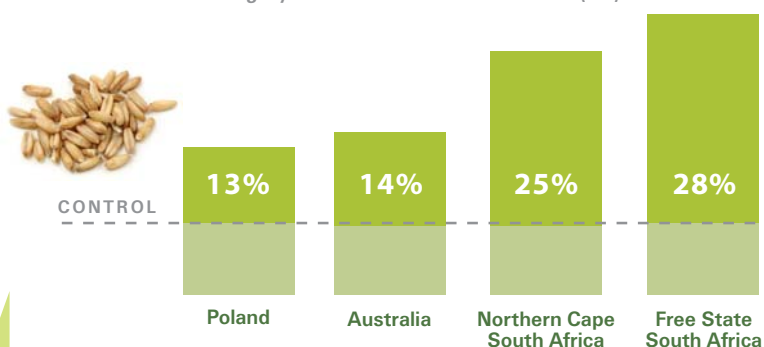
Kelpak wheat trials – dryland

Average yield increase above control (%)



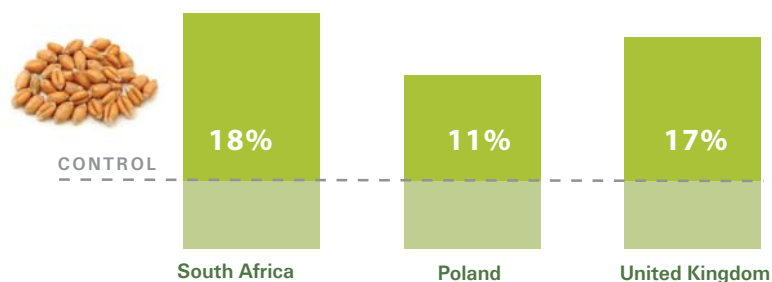
Kelpak wheat trials – irrigated

Average yield increase above control (%)



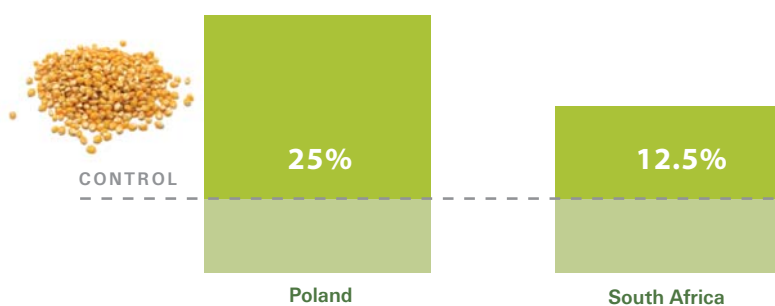
Kelpak barley trials – dryland

Average yield increase above control (%)



Kelpak trials – maize (corn)

Average yield increase above control (%)



**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

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

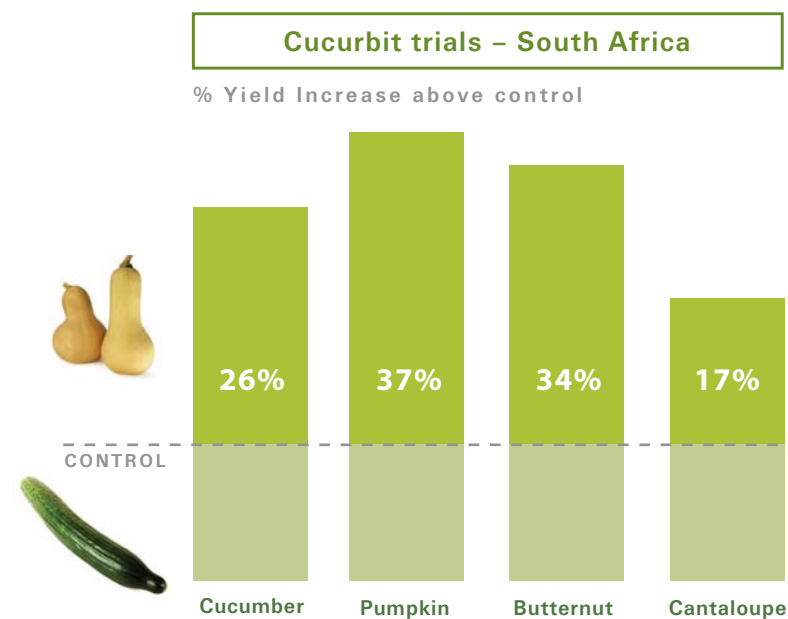
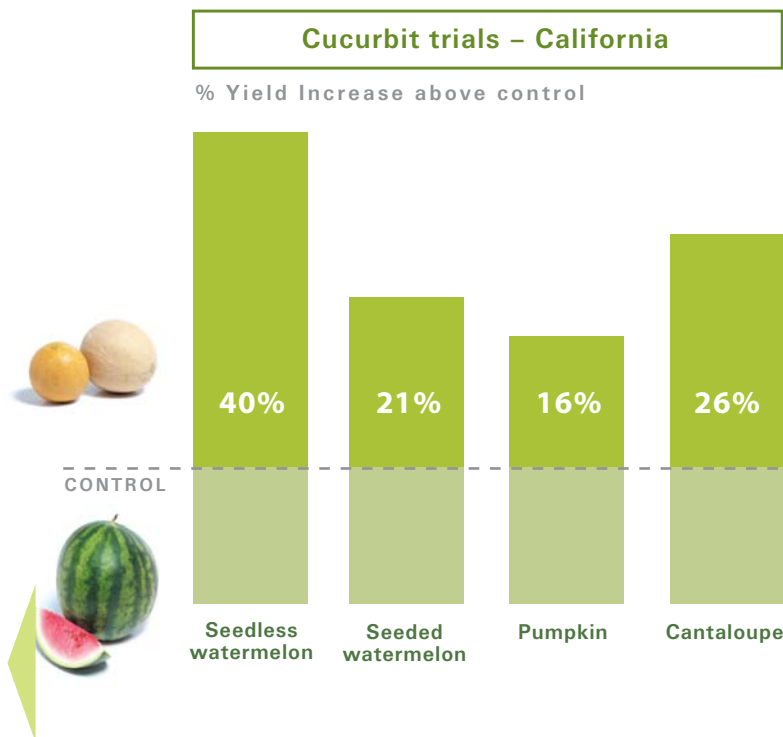
cucurbit crops



- **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**



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**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

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

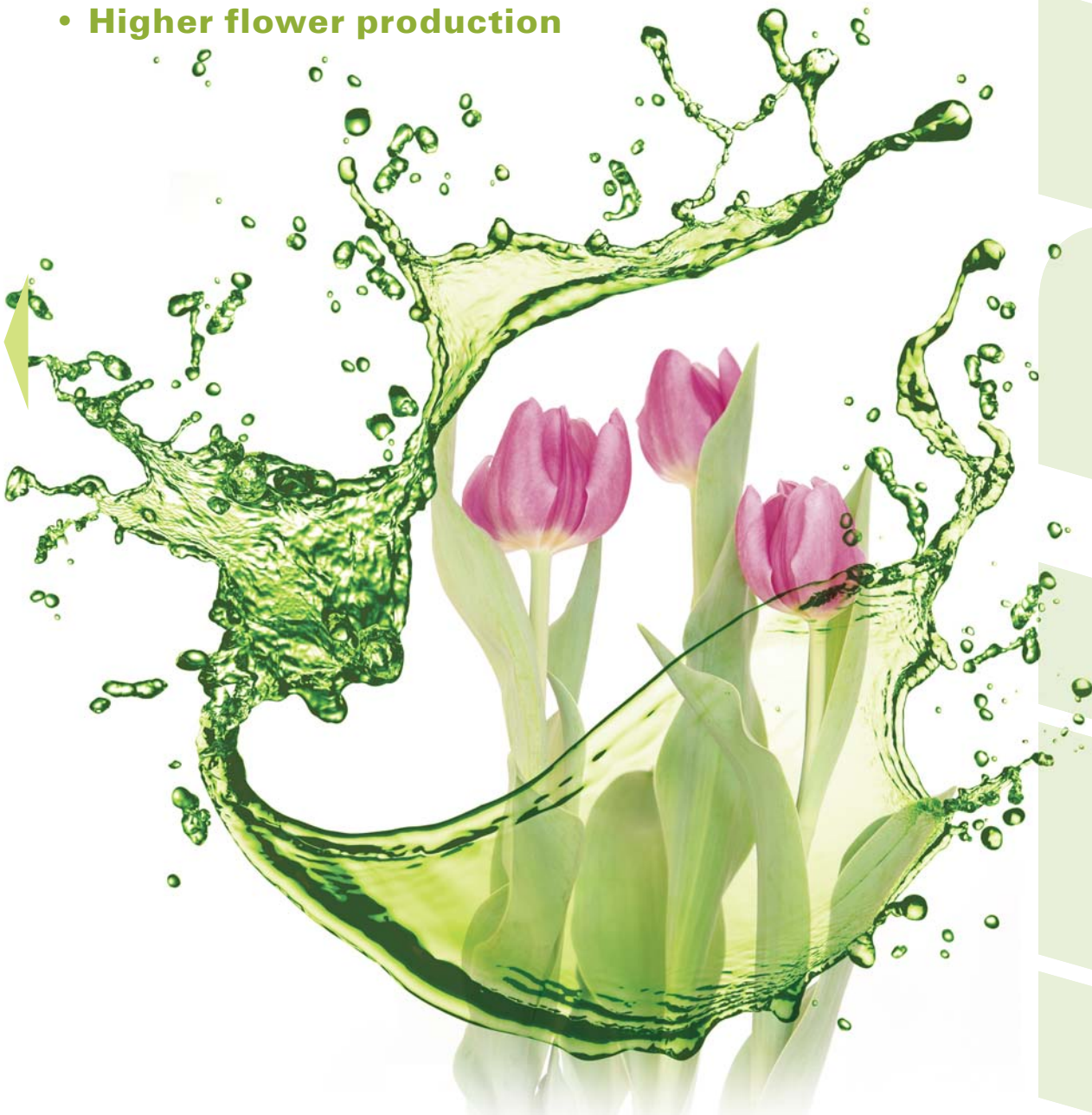
Apply Kelpak as a foliar spray at 2 to 3 L/ha at the 3 to 4-leaf stage and repeat the foliar application twice at 14 day intervals

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

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

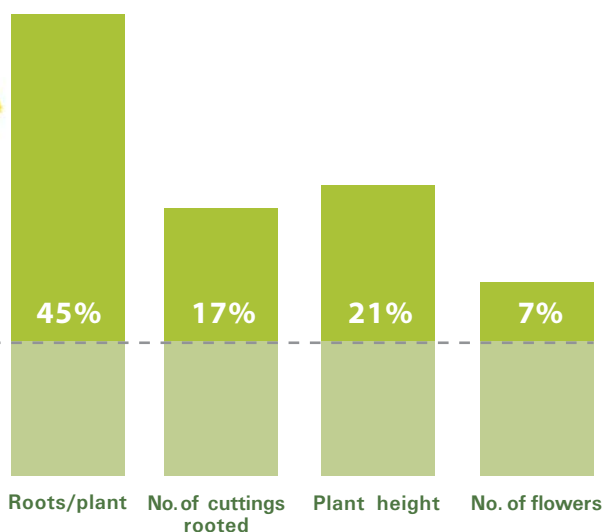


Kelpak, a natural biostimulator extracted from freshly harvested *Ecklonia maxima* kelp, scientifically proven to increase the health, quality and yield in a wide variety of flowers. The global leader in auxin based seaweed products for over thirty years

DROP FOR DROP, THE MOST EFFECTIVE BIOSTIMULANT

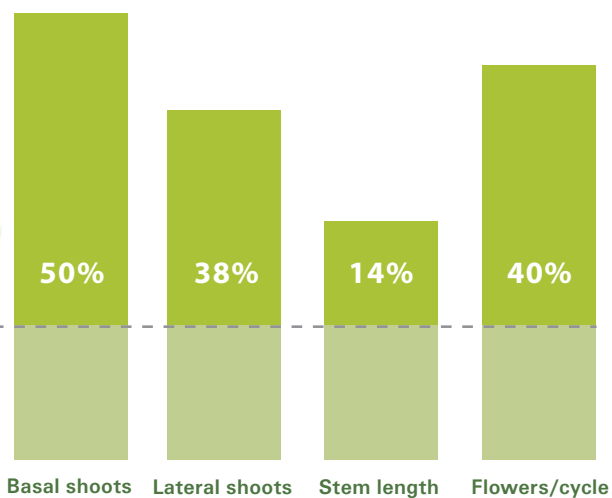
Kelpak on Chrysanthemum

Increase above control (%)



Kelpak on Rose Production – Ecuador

Increase above control (%)



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.

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**

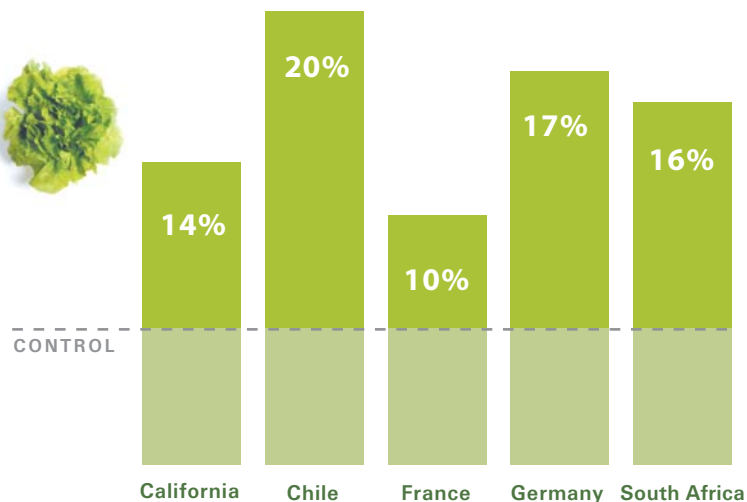


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Kelpak on lettuce globally

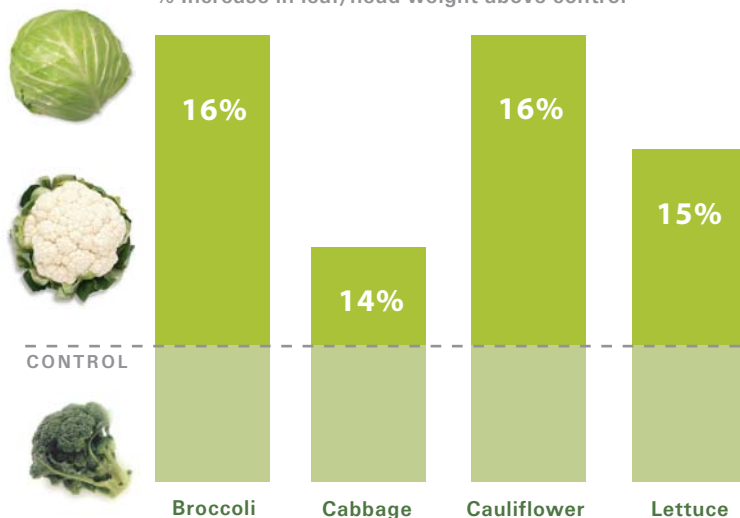
% Increase in leaf/head weight above control



**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

Leafy vegetables

% Increase in leaf/head weight above control



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

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

potatoes



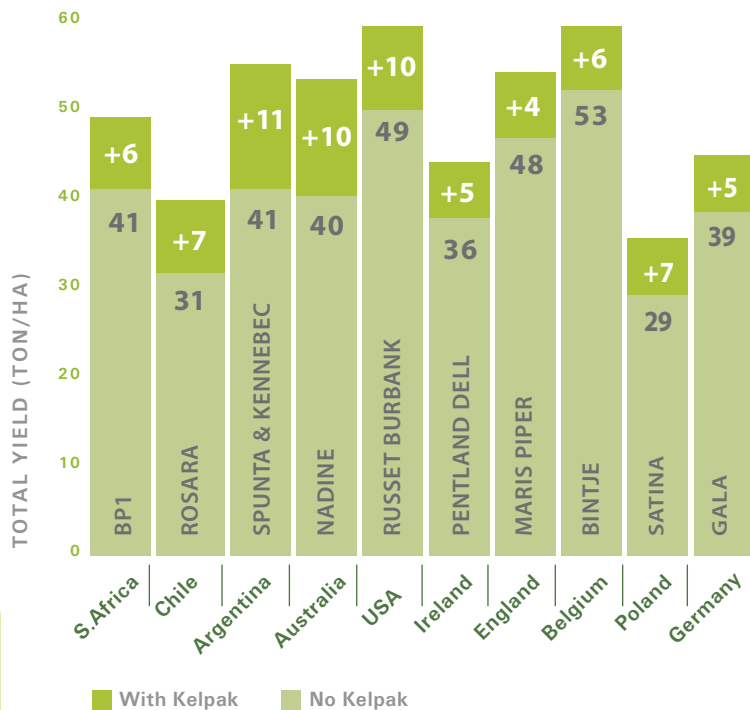
- **Increases vigour of root and shoot growth**
- **Improves nutrient uptake**
- **Increases resistance to nematode infestation**
- **Increases resistance during drought and waterlogged conditions**
- **Increases tuber number, size and total marketable yield**



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Kelpak on potatoes globally



**DROP FOR DROP
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Kelpak on potato yield quality

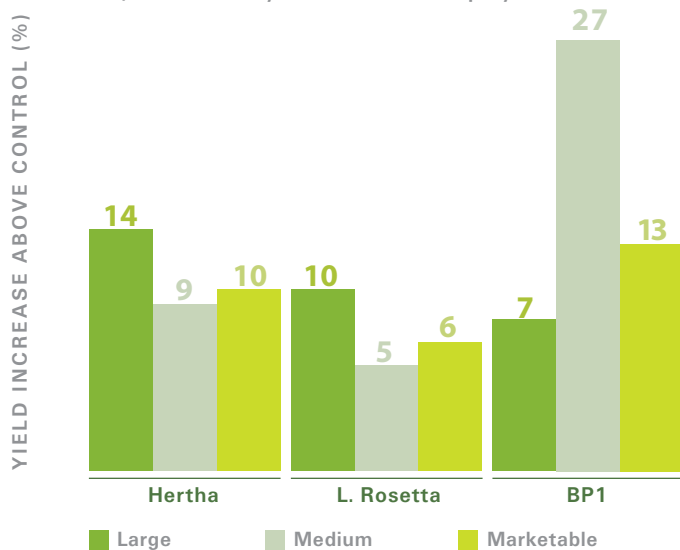
South African Agricultural Research Council

Treatment:

0.2% Seed dip

4 L/ha foliar spray (15 cm crown diameter)

2 L/ha 12 - 14 days after first foliar spray



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

rice

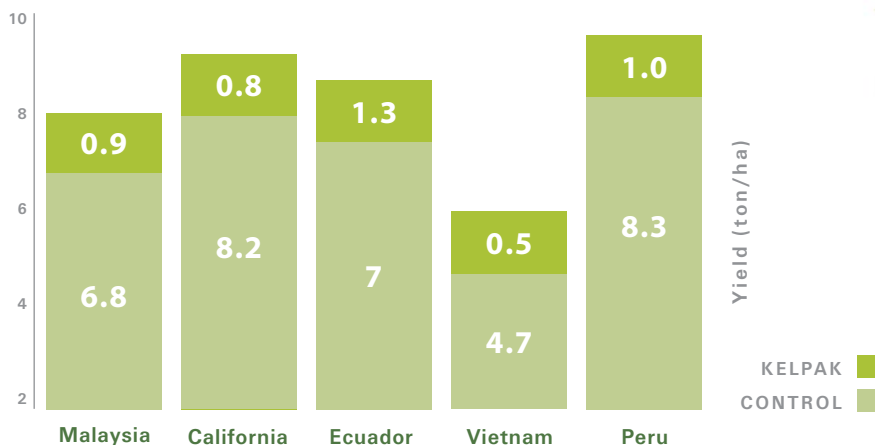


- Improves germination
- Improves root growth
- Increases tillering
- Increases number of panicles
- Increases yield
- Increases 1000 grain weight
- Reduces lodging



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Effect of Kelpak on Rice Yield



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 (\pm 25 days after emergence or \pm 15 days after transplant). Repeat foliar application of 1 - 2 L/ha at start of panicle initiation

**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

Global Rice Trial Summary

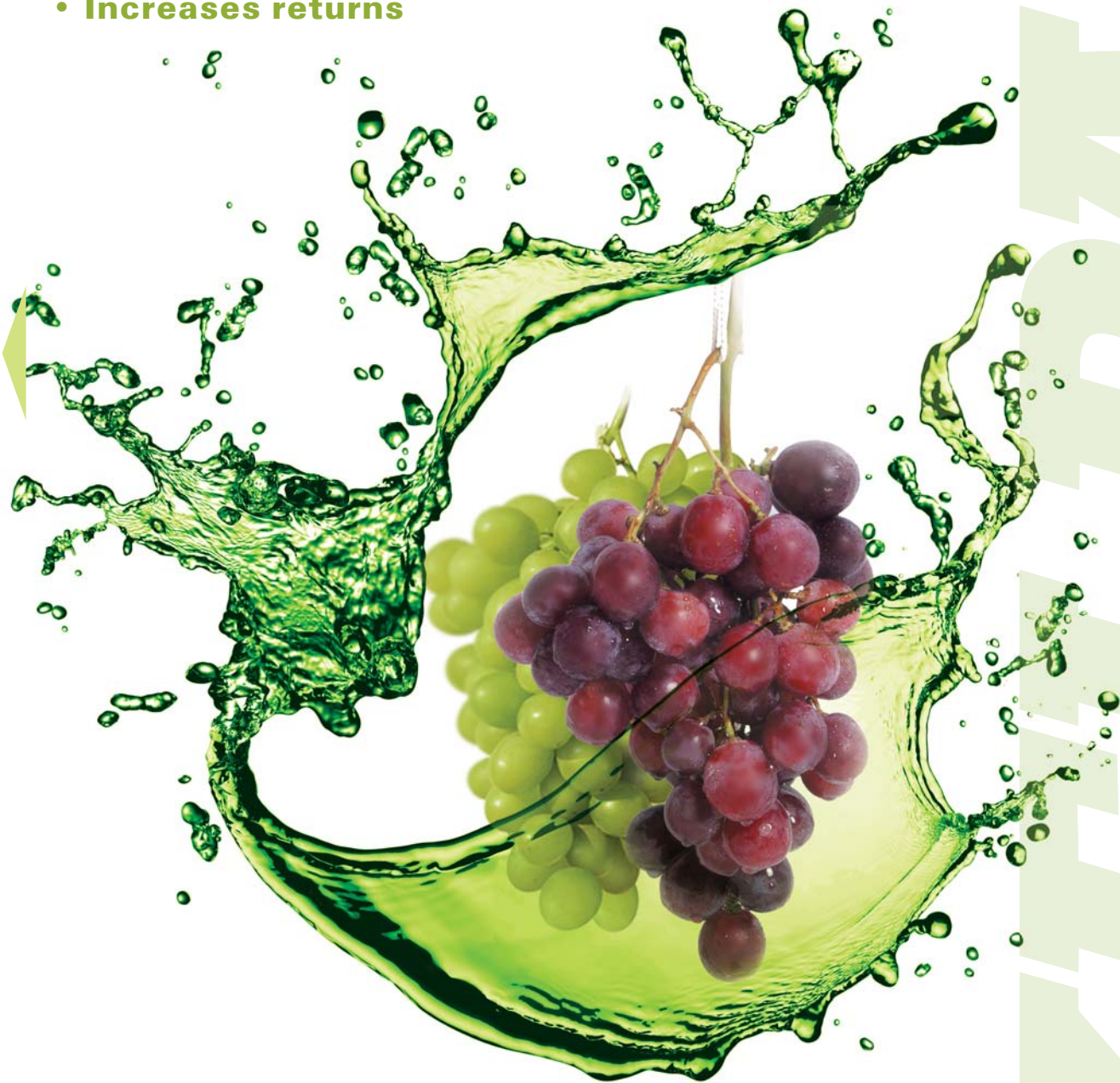
YEAR	Variety	Region	Treatment	Yield increase
1990	Sasanishiki	Miyagui Japan	20 d before culm emerge (0.2% spray)	+15%
1991	Akitakomachi	Akita Japan	3 d pre-transplant* and 35 d post-transplant (0.2% spray)	+16%
1991	Akitakomachi	Iwate Japan	3 d pre-transplant* and 27 d post-transplant (0.2% spray)	+11%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

* Seed bed soak with 0.1 - 0.2% Kelpak

table grapes



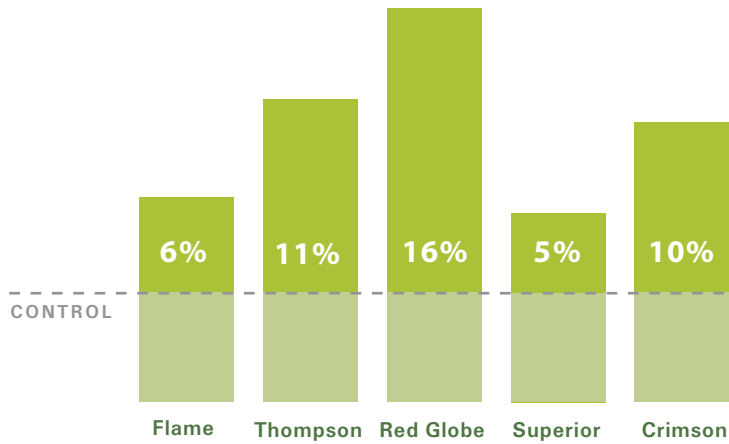
- **Increases vigour of root and shoot growth**
- **Bunch elongation (stretching)**
- **Increases berry size**
- **Increases number of export quality bunches**
- **Enhances bunch colour at harvest**
- **Often improves fruit sugar levels at harvest**
- **Increases returns**



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Kelpak on berry size – Chile

% Increase above control

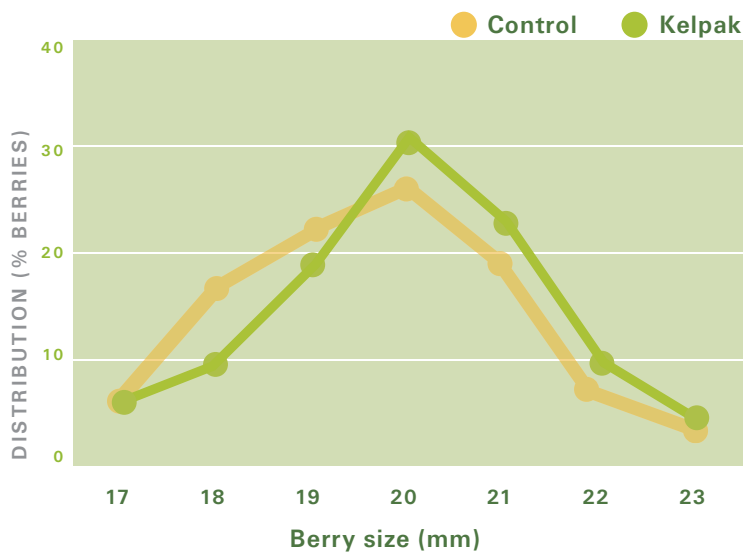


Quality improvement on grapes - South Africa

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

Foliar sprays sometimes replaced by directed bunch applications

Kelpak on berry size distribution



**DROP FOR DROP
THE MOST EFFECTIVE
BIOSTIMULANT**

RECOMMENDED USE ON TABLE GRAPES

For root stimulation, early growth and bunch stretching: Foliar sprays at 2 L/ha at 5 - 10 cm shoot growth. Repeat 14 days later.

For improved berry size and quality: Foliar sprays of minimum 3 L/ha after set. Repeat 2 to 3 times at 10 to 14 day intervals.

For improved colour and sugar content: Foliar sprays at 3 L/ha at start of berry softening. Repeat 14 days later.

Increase Kelpak rate to maintain 1:300 dilution when water volume above 1000 L/ha is used.

Use 4 - 5 L/ha with electrostatic applicators. Foliar sprays can be substituted with 1% bunch dips or directed bunch sprays. May be applied with gibberellic acid application.

tomatoes

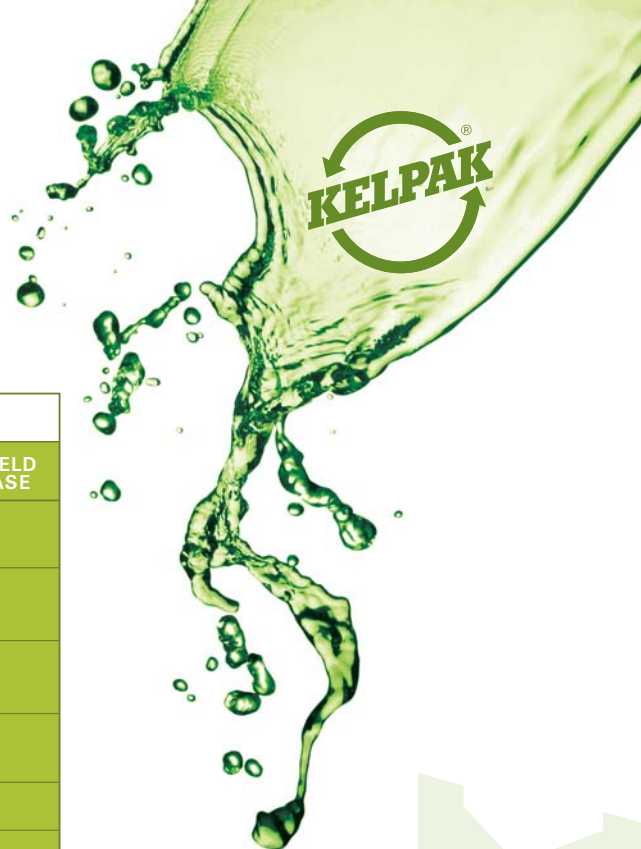


- **Reduces transplant shock**
- **Increases vigour of root and shoot growth**
- **Improves resistance to nematode infestation**
- **Increases fruit size and number, and total yield**
- **Produces higher early harvest yields**
- **Increases shelf-life of fruit by up to 1 week**



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DROP FOR DROP, THE MOST EFFECTIVE BIOSTIMULANT



Kelpak on Tomatoes				
COUNTRY	TYPE	RATE (L/ha)	APPLICATION	AVE. YIELD INCREASE
California	Processing	1.0% 2 – 2.5 L/ha x 2	Dip/drench Foliar sprays	10%
Chile	Greenhouse	1.0% 0.5% x 3	Dip/drench Foliar sprays	23%
Hungary	Field	1.0% 2 L/ha x 2	Dip Foliar sprays	21%*
Philippines	Field	1.0% 2 L/ha x 3	Dip Foliar sprays	31%
Poland	Field	2 L/ha x 3	Foliar sprays	7%
South Africa	Greenhouse & Field	1.0% 2 L/ha x 3 - 5	Dip/drench Foliar sprays	23%
Spain	Greenhouse	7 L/ha x 1	Drip after plant	70%*

* Yield of first 3 pickings

Shelf-life of tomatoes treated with Kelpak

APPLICATION	IMPROVED SHELF-LIFE
3 x foliar	+ 5 days
5 x foliar	+ 7 days
Soil drench	+ 6 days
Dip + 3 x foliar	+10 days



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

DROP FOR DROP, THE MOST EFFECTIVE BIOSTIMULANT



Kelpak on Tomatoes				
COUNTRY	TYPE	RATE (pt/A)	APPLICATION	AVE. YIELD INCREASE
California	Processing	1.0% 2 – 2.5 pt/A x 2	Dip/drench Foliar sprays	10%
Chile	Greenhouse	1.0% 0.5% x 3	Dip/drench Foliar sprays	23%
Hungary	Field	1.0% 2 pt/A x 2	Dip Foliar sprays	21%*
Philippines	Field	1.0% 2 pt/A x 3	Dip Foliar sprays	31%
Poland	Field	2 pt/A x 3	Foliar sprays	7%
South Africa	Greenhouse & Field	1.0% 2 pt/A x 3 - 5	Dip/drench Foliar sprays	23%
Spain	Greenhouse	7 pt/A x 1	Drip after plant	70%*

* Yield of first 3 pickings

Shelf-life of tomatoes treated with Kelpak

APPLICATION	IMPROVED SHELF-LIFE
3 x foliar	+ 5 days
5 x foliar	+ 7 days
Soil drench	+ 6 days
Dip + 3 x foliar	+10 days



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