Advanced Coated Fertilizer for the new agriculture

Fertilizers are essentially need to harvest higher amount of crops with high quality.

The new concept is "Just fit fertilization to crops growth" and "Reduction of fertilizer burden to the environment".

Meister is the release programmed coated fertilizer to answer to such requests.

Features

Easy fertilization

Only one time basal application is necessary for the whole growth of crops,which save manpower for the repeated additional fertilization.
This is more and more effective for the longer period growing products.

Low production cost

Much fertilizer saving is possible by higher efficiency fertilization,especially for longer period growing crops and larger amount fertilization crops.
Using this fertilizer decreases the total plantation cost including labor cost.

Homogeneous High Quality Products

Optimized fertilizer supply to each crops result in the homogeneous high quality products.

Lower Environmental Pollution

Optimized high efficiency fertilization reduces the fertilizer pollution to the surface water, underground water and to the air. Meister is the environment protecting fertilizer.

Physical Property

Meister is the coated fertilizer based on the spherical urea.
Meister is good for the fertilization by machines because of spherical figure and sharp particle size distribution. Meister is good for the blending because of non-absorbent property.
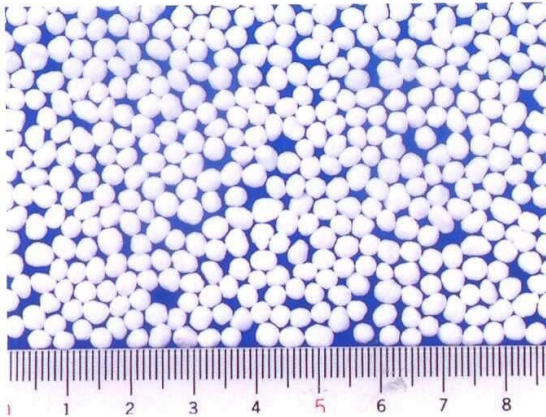
Size of the original

Guaranteed content of segment :
Linear Release Type 42%
Sigmoid Release Type 41%
Color : white
Figure : Spherical
Particle Size : 2~4mm
Density : 1.3 (Real density)
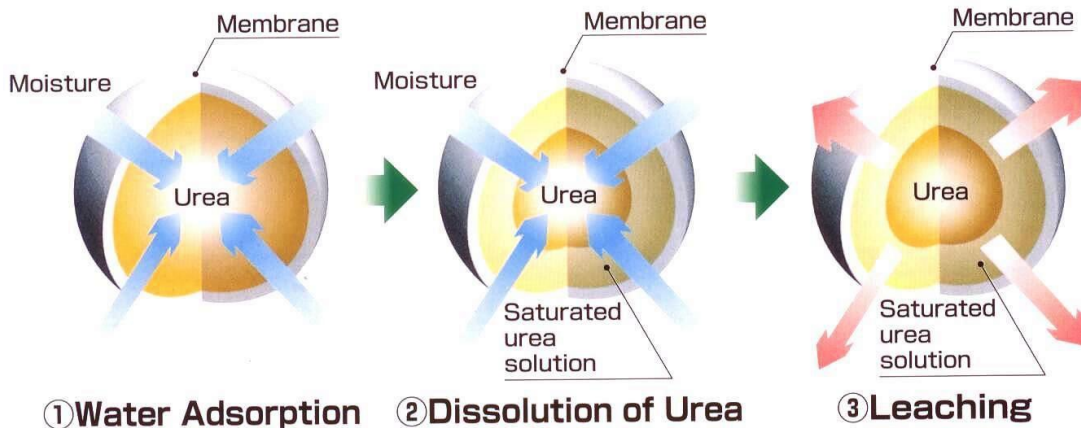   0.8 (Bulk density)
Water Adsorption : no
pH : 7.0
Hardness : 2~3kg/particle
Angle of Repose : 40°

Segment Release Mechanism

①Water Adsorption

①The water moisture is taker in to the particle through the membrane.

②Dissolution of Urea

②The water taken in through membrane dissolves internal fertilizer.

③Leaching

③The water pressure in the Meister particle is increased and the urea solution leak out through the polymer membrane.

Release Patterns

Meister control the release of fertilizer segment precisely without changing the membrane thickness to keep the segment content constant.
The best-fit application to the crops is possible by selecting the one from so many release patterns and the combination of them.
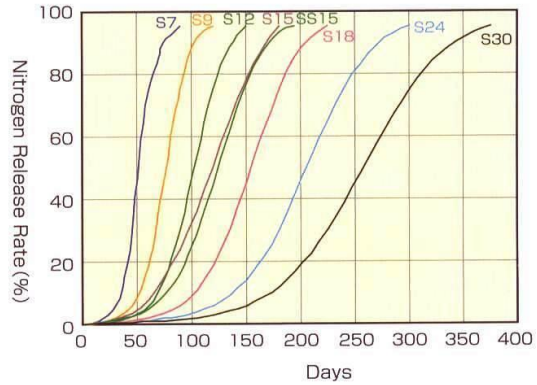
Typical Release patterns (at soil temperature 20℃)

Numbers of grade name of Meisters are roughly one tenth of 80% segment release days at 20 degree C in the soil.
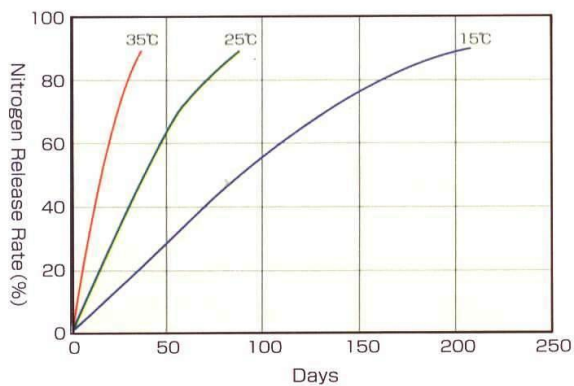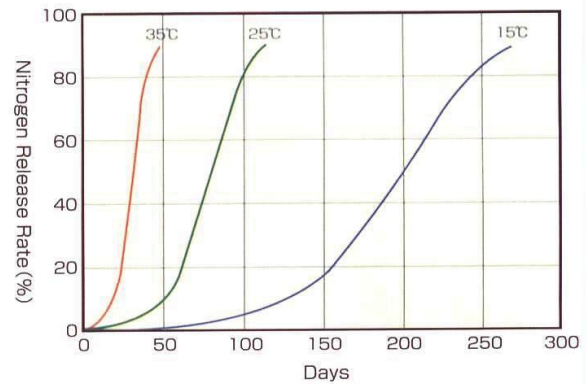
Linear Type
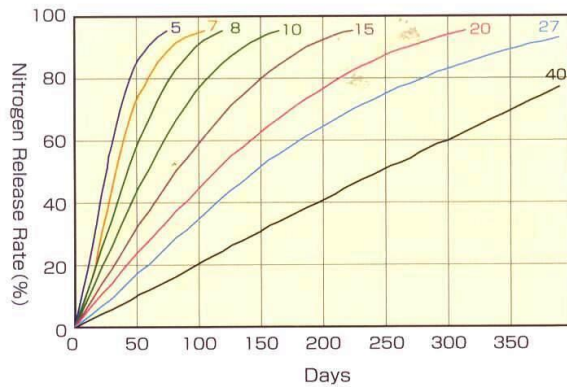
Sigmoid Type

The effect of temperature

The release rate change along with the soil temperature.

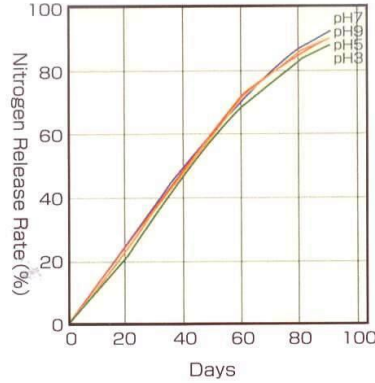### Linear Type (Meister 10)

Sigmoid Type (Meister SS15)

Effects of other soil conditions

The effect of soil moisture is not so large on the release rate of the fertilizer segment,and there is few effect of soil kind,pH,activity of microbes in the soil and oxidation-reduction potential on the fertilizer segment release rate.
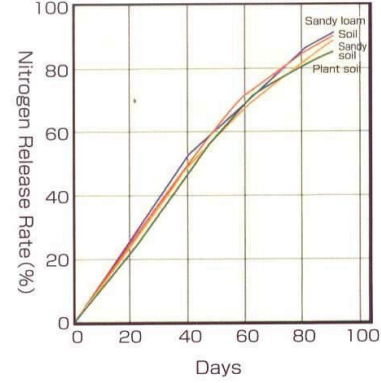
Effect of soil moisture (Meister10)

Water content in the soil of maximum water content it
50%
90%
60%
30%

Nitrogen Release Rate (%)

Days
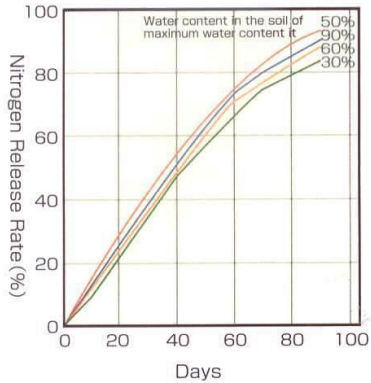
Effect of soil pH (Meister10)

pH7
pH9
pH5
pH3

Nitrogen Release Rate (%)

Days

Effect of soil types (Meister10)

Water content in the soil is 60% of maximum water content in it.

Sandy loam
Soil
Sandy soil
Plant soil

Nitrogen Release Rate (%)

Days

Estimation of the fertilizer release

Ideal fertilizer plan can be prepared based on the computer calculation of release Pattern.

Simulation Results of release pattern (Paddy field)

Meister mx444V50

Marks:
Meister ss15,
Fast release N fertilizer

Differential N release rate (%) Bars

Cumulative N release rate (%) Line graph

Days
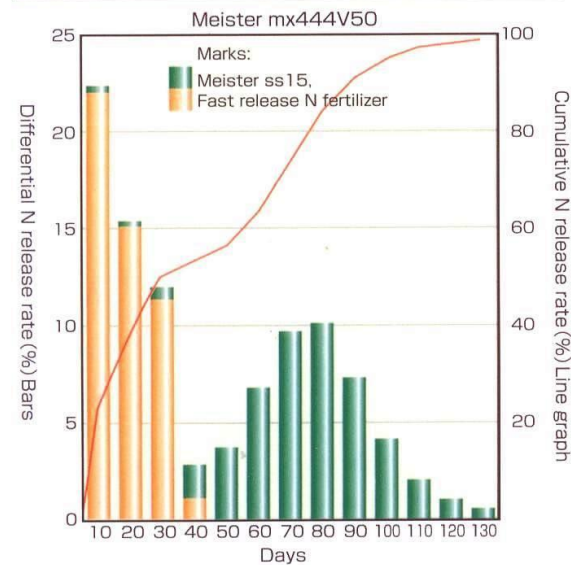
Months JUNE JULY AUGUST SEPTEMBER OCTOBER

Cultivation stage ◆ Transplantation ◇ Young ear production ▲ Come into ear ☆ Harvest

Simulation Results of release pattern (Upland)

One shot application for strawberry

Marks:
Meister S18
Meister S12
Egg Type CDU

Differential N release rate (%) Bars

Cumulative N release rate (%) Line graph

Days
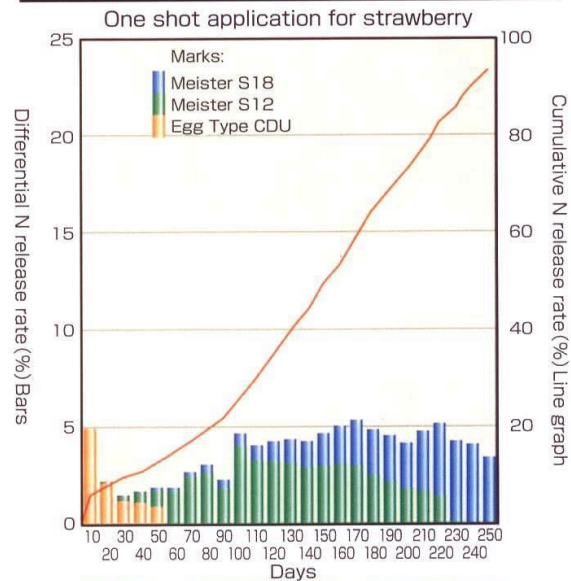
Months SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBLUARY MARCH APRIL MAY

Cultivation stage ◆ Transplantation ☆ Beginning of harvest ★ End of harvest

Application

- Good fit to many kinds of agricultural products, such as rice, wheat, maze, vegetables, flowers, fruits and tee.
- Good fit to long period growing agricultural products, which need many additional application by conventional fertilizers and for mulch film cultivation which is not fit for the additional fertilization.
- Good fit for the sandy field cultivation, where ordinally fertilizers are easily washed out to under ground water by irrigation and rain.
- Good fit for the one time basal application.

Grade List

| MEISTER |

Linear Release Type

Brand Name	80% Release (Days at 20℃)	80% Release (Days at 25℃)	Japanese Brand Name	N content (%)
MEISTER-5	50	30	LP-30	42
MEISTER-7	70	40	LP-40	42
MEISTER-8	80	50	LP-50	42
MEISTER-10	100	70	LP-70	42
MEISTER-15	150	100	LP-100	42
MEISTER-20	200	140	LP-140	42
MEISTER-27	270	180	LP-180	42
MEISTER-40	400	270	LP-270	42
MEISTER-70	700	350	LP-350	42

Sigmoid Release Type

Brand Name	Time Lag Days / Release Days		Japanese Brand Name	N content (%)
	at 20℃ in soil	at 25℃ in soil		
MEISTER-S7	35/35	20/20	LP-S40	41
MEISTER-S9	45/45	30/30	LP-S60	41
MEISTER-S12	60/60	40/40	LP-S80	41
MEISTER-S15	45/105	30/70	LP-S100	41
MEISTER-SS15	70/80	45/55	LP-SS100	41
MEISTER-S18	90/90	60/60	LP-S120	41
MEISTER-S24	120/120	80/80	LP-S160	41
MEISTER-S30	150/150	100/100	LP-S200	41

The decomposition of the coating polymer composition.

The model of Meister membrane decomposition

Sunlight → Cracks — Sunlight → Crush — **Water, Carbon dioxide**

Completion of urea release — In the soil — Cracks — during cultivation mechanical pressure — Crush — Microbes in the soil

Photo-degradation | **Bio-degradation**
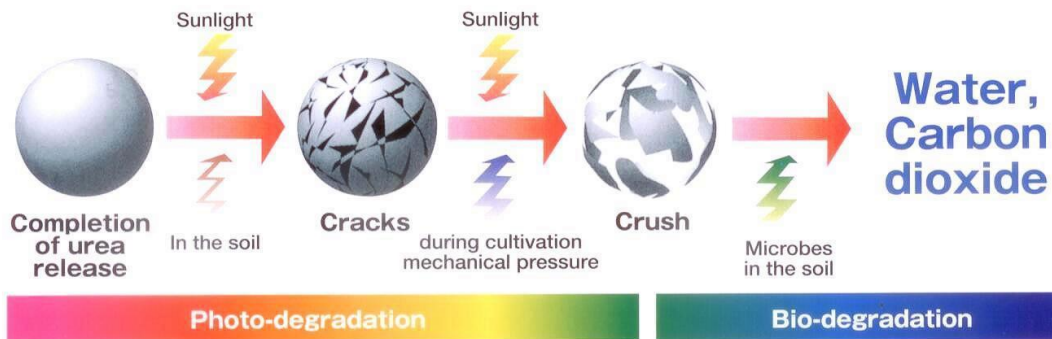
Meister is the stepwise-degradable coated fertilizer in the environment, of which polymer membranes are decomposed by the sunlight first to lower molecular weight polymer composition and further decomposed by microbes.

① The main composition of Meister membrane is photo-degradable polymer and natural inorganic filler. Natural polymer is also used for sigmoid grades.
② Meister membrane deteriorated by long time exposure to sunlight and become fragile.
③ Small fragments of Meister membrane after the sun light exposure, are decomposed by microbes in the soil.

Membrane decomposed by 12Months exposure to sunlight /Meister SS
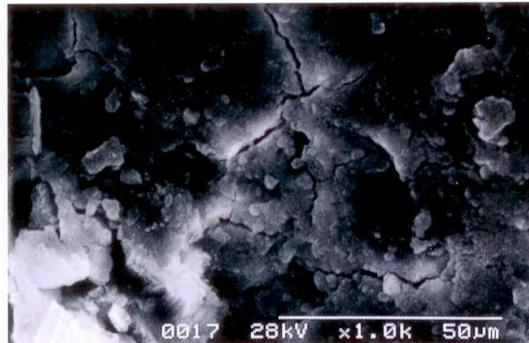
Cracks are observed in the membrane in the soil after 2 months
Amplification:(1000Times By SEM)

Caution

■ The combination of Meister with fast release Nitrogen fertilizers, other fertilizers, is recommended as the Meister is slow release Nitrogen fertilizer.
■ The fertilization in the soil is recommended for the accurate release control. The segment release will delay in the case of surface application.
■ Before the mechanical fertilization of Meister with the machine, please confirm the manual of the machine and be careful at the initial release situation. Sometime, the membrane of Meister particle is partially injured by the machine and some particle made earlier release of the segment.
■ Please shut the mouth of the half used Meister bag tightly to avoid the effect of environmental moisture and to keep the accurate release control performance.
■ Please avoid the long time exposure under the sunlight such as one week or keep under the high temperature such as 60 degree C before use.

JCAM AGRI.CO.,LTD.