

ROVIMIX[®] β -Carotene

The fertility antioxidant

Delivering leading technology and setting industry standard for high-plasma levels of β -carotene to ensure fertility and long lifetime performance in Dairy cows.



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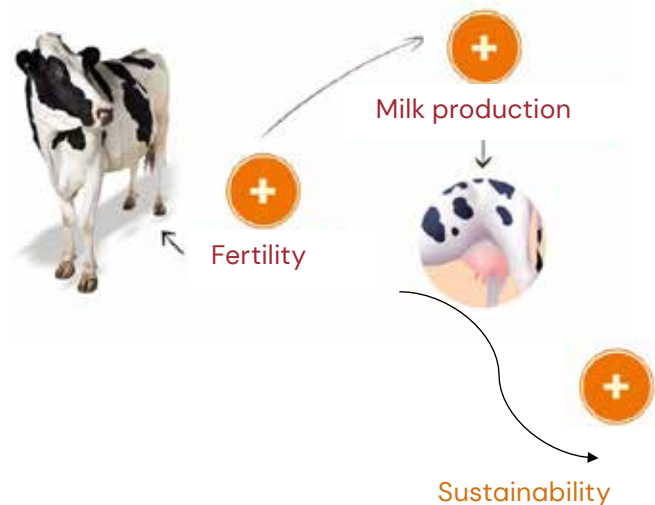
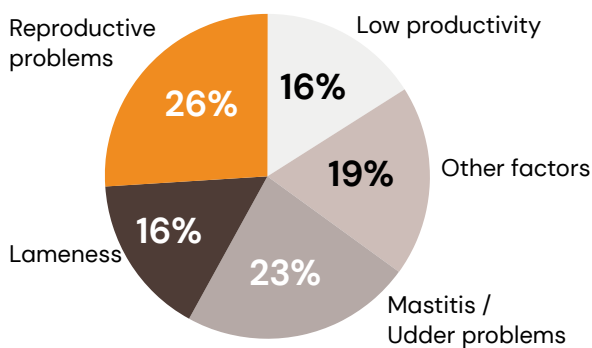
ROVIMIX[®] β-Carotene

Reproductive challenges in Dairy Cows

Cow longevity is closely related to profitability but also sustainability; Healthy cows reach their full milk production potential in the 5th year whereas reproductive lifespan of dairy cows' range between 3-4 years.

Moreover, a herd with higher proportion of heifers and primiparous emits more methane and phosphorus/kg of milk (Hirstif, 2013).

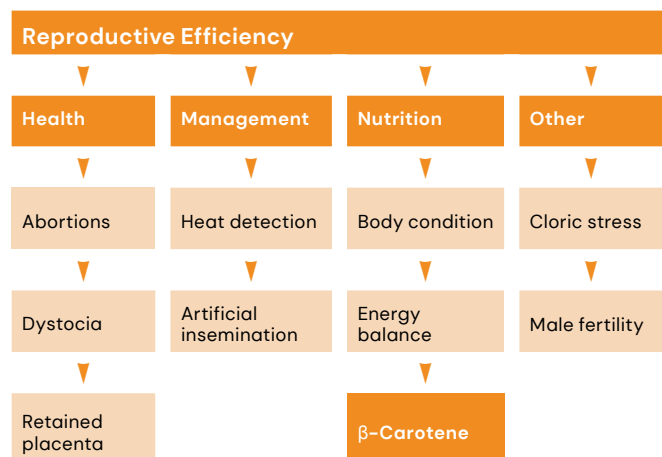
- **Infertility is the first culling reason in dairy herds**
- Road to a successful breeding season can be long and challenging, especially for modern dairy cows



- Infertility and reproductive disorders are multifactorial
- Nutrition being an important factor

Main issues	Incidence
Failure to return to cyclicity 40d after calving	30%
Failure to fertilized at 1st oestrus	25%
Early embryonic mortality	40%
Late embryonic mortality	20%
Fetal mortality	5%
Perinatal mortality	8%

Source: Walsh, 2011



ROVIMIX® β -Carotene

Importance of β -Carotene in Dairy Fertility

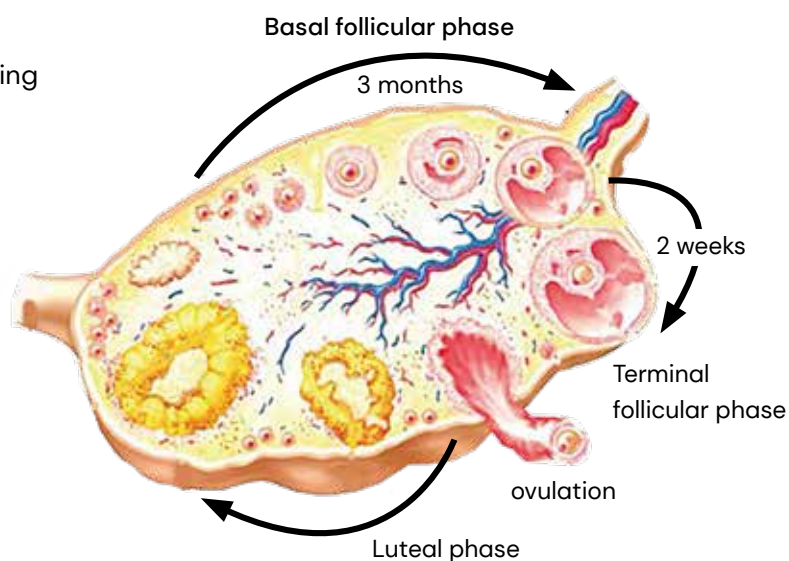
How β -Carotene impacts the reproductive cycle?

During follicular phase:

- Quicker resume to cyclicity after calving
- More intense oestrus

During luteal phase :

- Faster embryo development
- Increased progesterone production
- Less early embryo mortality
- Higher pregnancy rate



Why to supplement dairy cows with β -Carotene?

- **Majority of high yielding dairy cows face a high deficiency in β -Carotene at the critical stage of follicle development**
- **Main sources of β -Carotene are forages but except of grazing systems, β -Carotene levels are too low to meet modern dairy cows' requirements**

β -Carotene consistently improves fertility through better follicle quality leading to better fertilisation and less embryo loss

dsm-firmenich driving sustainable growth in Dairy production:

ROVIMIX® β -Carotene provide a reliable and predictable content of β -Carotene in your premix and feed.

The secure supply from one of the world's leading sustainable food & feed vitamin producers is a cost-effective way to achieve the optimum health and performance that you expect in your animals for more sustainable farming.

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Making efficient use of natural resources



Improving lifetime performance of farm animals

β-Carotene supplementation guidelines in ruminants

Supplementation Guidelines

β-Carotene plasma levels before calving are key for β-Carotene enrichment in the ovary and the colostrum

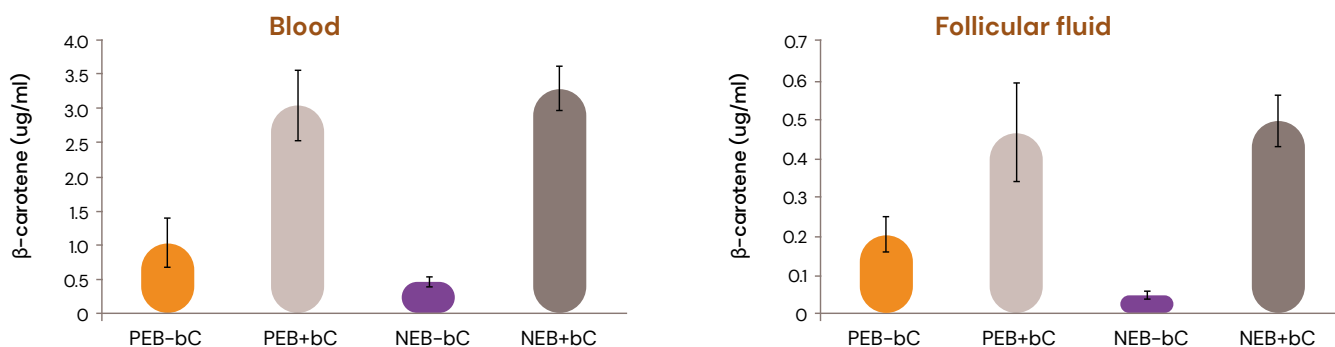


Category	Phase	β-Carotene mg/head/day	When
Heifers (dairy replacement)	Rearing	300-500	6 – 8 weeks before 1st insemination/mating when intake of green forage is low
	6-4 weeks precalving	500-1000	Lower level 8 weeks before 1st calving, upper level 4 weeks before 1 st calving when intake of green forage is low
Beef Cows		300-500	6 – 8 weeks before 1 st insemination/mating when intake of green forage is low
Dairy Cows	Dry cows, Far-off	500-1000	Lower level during the entire dry period (far-off and close-up); upper level 3 – 4 weeks before calving (close-up only)
	Dry cows, Close-up	500-1000	Lower level 8 weeks before 1st calving, upper level 4 weeks before 1 st calving when intake of green forage is low
	Lactation	300-500	Dry and fresh beginning during the dry period until pregnancy is confirmed
Calves (milk replacer)	0-3 months	100 mg/kg dried feed	For 2 wks after colostrum period

Source: 2022 OVN Optimum Vitamin Nutrition® supplementation guidelines for ruminants

Impact of ROVIMIX® Supplementation

- β-Carotene supplementation increase β-Carotene level in blood and follicular fluid
- β-Carotene supplementation oversets the drop in β-carotene level caused by negative energy balance



Source: De Bie and al, JDS 2016. Supplementation with 20g/cow/day of ROVIMIX® β-Carotene 10%

ROVIMIX® β -Carotene

Leading technology

Rovimix® β -Carotene product form is key to achieve the correct β -Carotene plasma levels for optimum herd management

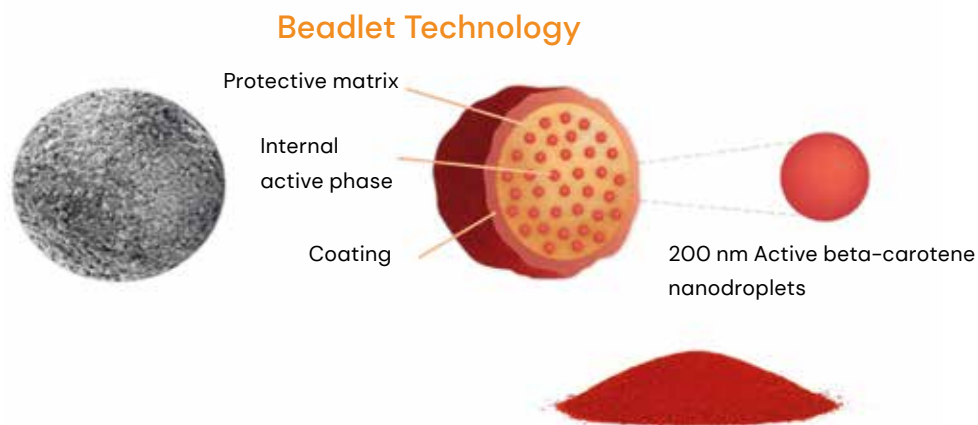
What is β -Carotene?

Plant natural pigment and antioxidant

β -Carotene is a plant natural pigment and antioxidant, discovered almost 200 years ago. Is the most common carotenoid in green plants (grass, alfalfa...), is fat soluble and very sensitive to breakdown. β -Carotene is the major carotenoid in Bovine Plasma.



dsm-firmenich leading beadlet technology provides superior product forms as in ROVIMIX® β -Carotene



ROVIMIX® β -Carotene 10% formulated proven to be stable to deliver the accurate level of β -Carotene to the cow

Stability and formulation

Product stability	Initial	After 1 month	After 2 months
ROVIMIX® β -Carotene	102%	92%	88%
Competitor A	86%	77%	59%
Competitor B	99%	67%	56%
Competitor C	115%	82%	70%

Premix stability	1 month	3 months	6 months
ROVIMIX® β -Carotene	93%	85%	83%
Competitor A	82%	59%	35%

Stability in a mineral premix of 95% mineral carrier and 4% trace elements at 25 °C and 60% relative humidity

As is stability 30 °C, 65% relative humidity

dsm-firmenich solution to improve reproductive performance in Ruminants for more sustainable farming

ROVIMIX® β -Carotene: Best in class feed source

- **I-Check β -Carotene:** Precision services to assess plasma level of β -Carotene
- **OVN Optimum Vitamin Nutrition®** supplementation guidelines for Ruminants



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