

# 30% reduction of methane exhaust in the dairy industry is possible

Going from 2,5 to 5 lactations and going for a first calving age of 23 months has a huge impact on our environment.

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## **CONCLUSION**

From the calculation, it can be concluded that a methane reduction of 32,78% can be realized. In the Netherlands, where the average lactation is already 3,4. there can be a reduction of 28,23% If a reduction of 32,78% worldwide can be realized in dairy farming, it means an reduction of 3,5% of the total methane emissions in the world.

Going from 2,5 to 5 lactations is possible. Going from 27 to 23 months first calving age is also possible. We recommend to spread best management practice between farmers by organizing workshops on farms. This can be realized by spreading practical knowledge by means of books, internet trainings and live trainings of CowSignals and YoungStock Signals.

**SUMMARY RESEARCH REPORT**

Aim of the report is to show how much methane (CH<sub>4</sub>) exhaust can be reduced when the lifespan of dairy cattle is prolonged from 2,5 to 5 lactations and going for a first calving age of 23 months. Methane is a greenhouse gas, 23 times more pollutant than CO<sub>2</sub>. The dairy industry is a main contributor to methane exhaust and therefore plays an important role in the discussion on how we can reduce the emission of greenhouse gasses.

The literature tells that the methane production per kg milk drops when the milk production of the cow rises.

Tabel 1 Methane exhaust per lactation (Van Laar e.a., 2004, Van Straalen, 2006, CRV 2010)

Milkproduction per lactation	kg milk	g methane/kg milk
Lactation 1	8.399	14.72
Lactation 2	9.499	14.00
Lactation 3	10.067	13.00
Lactation 4	10.220	13.60
Lactation >=5	9.952	13.80

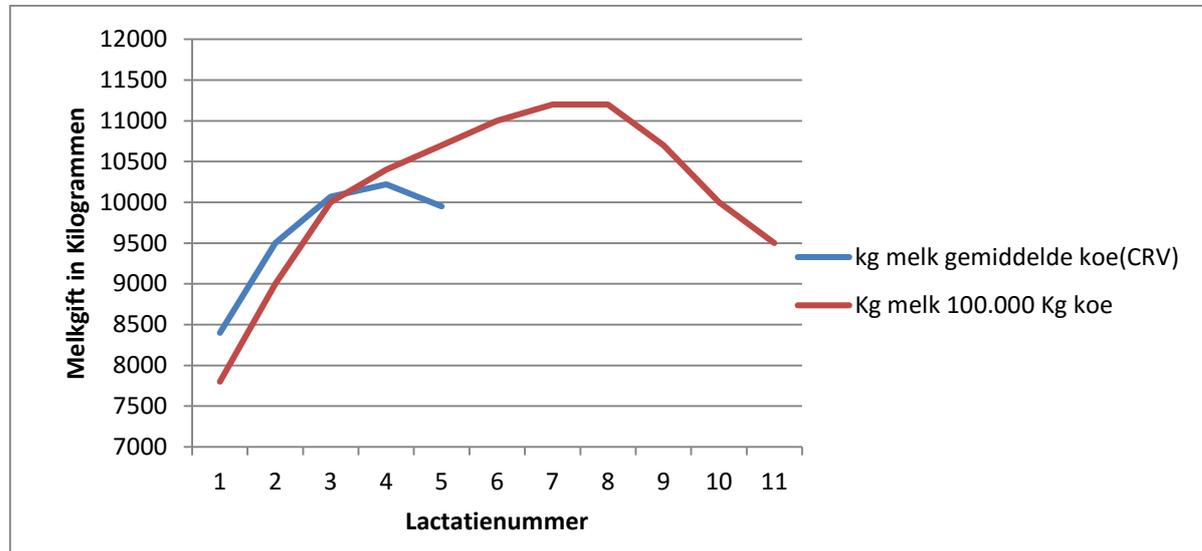
Older cows have a better feed efficiency, according to research by Wageningen UR. Cows that become older, have less hoof problems (lameness), mastitis, or other disadvantages, making those cows to produce more efficient. Also, older cows do not grow anymore, so they use all the feed for milk production. Hereby, it is likely that the feed efficiency of older cows is higher. It is assumed that the feed efficiency rises from 1,2, what is now the average, to 1,5. Because there is a strong correlation between feed efficiency and methane production, according to Wageningen UR, it means that the methane production drops with the same factor.

Tabel 2 Voerefficiëntie bij verschillende koeien (Van Schooten, H., H. Dirksen, 2013)

Age	Days in lactation	Feed efficiency
All cows	150-225	1,3-1,6
Heifers (1 <sup>st</sup> lactation)	<90	1,4-1,5
Heifers (1 <sup>st</sup> lactation)	>200	1,1-1,3
Older cows	<90	1,5-1,7
Older cows	>200	1,2-1,3
Fresh cows	<21	1,15-1,3

Cows who have given 100.000 kg, show us another progress of milk production than the average milking cow in The Netherlands. The 100.000 kg cows start slowly with a lower milk yield but rise longer and harder, and give milk more lactations.

Figure 1 Comparison milk production in kg average cow vs 100.000 kg cow



The methane production from rearing rises logical when the rearing period is longer.

Tabel 3 Methane exhaust young stock (Van Laar e.a., 2004, Van Straalen, 2006)

Calving age heifers in months	Total exhaust methane in kg
21	71.86
22	76.77
23	82.12
24	87.92
25	93.86
26	99.96
27	106.22
28	112.47

The optimum age for a heifer to calf is 23 months. The literature proves that heifers with a calving age of 23 months have a higher milk production.

Tabel 4 Milk production related to first calving age. (Van Laar e.a., 2004, Van Straalen, 2006)

Calving age heifers in months	Production 1e lactation (kg)	Lifetime production (kg)
21	8.888	21.330
22	10.075	31.230
23	10.363	38.345
24	11.298	36.154
25	10.026	32.085
26	9.332	21.465
27	9.504	19.960

The estimated average lactation worldwide in free stall systems is 2,5 lactations, with a first calving age of 27 months. We want to go to an average lactations of 5 and a first calving age of 23 months. To calculate what the effect would be on methane exhaust, we include the following issues:

- o Milk production per cow, by counting the milk yield of every lactation.
- o Average milk production per lactation, by dividing the total production by the number of lactations.
- o Methane production of the milking cow, by multiplying the milk production of every lactation with the relating methane production per kg milk, assuming two values of feed efficiency.
- o Methane production of young stock, by multiplying the number of young cattle per milking cow by the methane production of young cattle, with relating calving age.
- o Total methane production, by counting the methane production of the milking cow and the methane production of the young stock.
- o Gram methane per kg milk, by dividing the total methane production by the total milk production.

**CONCLUSION**

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