

Overview

High chopped corn is a higher quality alternative to standard corn silage. High chopped corn silage refers to corn that is harvested approximately 40cm from the base of the plant, as opposed to the traditional chopping height of 15cm. This method creates higher concentrations of starch as well as reduced amounts of woody fibrous stem harvested, therefore reducing silage neutral detergent fibre (NDF) content. With a lower NDF% content than standard corn silage, cows can consume a greater amount of higher quality feed which can result in greater milk production.



Variety Selection

Select on grain (starch) to forage ratio and length of growing season which ranges from 90 - 150 days. High yield is essential to achieve a low cost silage.

Growing

For high chopped corn, seeding rate should be reduced from 100, 000 seeds/ha to 80, 000 seeds/ha. Research conducted by Pacific Seeds and DAF on three common corn varieties demonstrated that the best yield and higher starch were achieved at 80 000 seeds/ha, as can be seen in table 1 below.

Table 1 - Average yield, starch and neutral detergent fibre (NDF) concentrations of three varieties of corn.

Seeding rate ('000 seeds/ha)	Yield (t DM/ha)	Starch (% DM)	NDF (% DM)
40	20.13	33.1	38.2
60	22.62	34.3	39.6
80	26.55	33.8	40.1
100	24.7	28.4	41.5

Precision plant seeds into 65 - 100 cm row spacing. Plant seeds into seedbed with full soil profile moisture. Aim for a minimum soil temperature of 12 – 14oC at 9 am for three consecutive days at 10 cm. Pre and post emergent herbicide is highly recommended to minimise weeds and competition for radiation, water and nutrients.

Harvesting

To maximise quality, corn silage should be harvested at 32-35% dry matter (DM) or when the milk line is visible half way down the kernel (see Image 1 below). As harvesting height is what differentiates high chop corn, harvesting contractors should be requested to raise the header front and tighten rollers to ensure grain is cracked (see Image below).

Residual stubble can be harvested as a fibre source, referred to as footlage or returned to the soil. In 2016, a C4Milk trial calculated the residual stubble of a high chopped corn crop to be approx. 1.5t DM/ha when harvested at 40cm high. Chop length should be 10 - 15 mm and processed to aid absorption of starch in the rumen.



Image 1: <http://www.mississippi-crops.com>

At the point of harvest you need to direct the silage contractor to harvest at 40 cm. The contractor may want to harvest lower as the more they harvest per hectare the greater the benefit to them, so ensure proper communication with contractor to get the correct chopping height.

Nutritive Value & Yield

The cost of high chopped corn is comparable to standard chop, but the real benefit of high chop corn is the reduced NDF%.

C4Milk trials have found that harvesting the corn higher can reduce the yield by 1.5 tDM/ha, however the starch was found to be 3% higher than the same crop harvested as a whole plant. The NDF% was found to be lower and this means the cow can consume more feed, hence potentially more milk production. Table 2 highlights the following findings:

- Yield is reduced by 1.5 t DM/ha when you chop at the higher level.
- Starch is higher with high chopped corn, meaning more energy for milk.

- Metabolisable energy is higher in high chopped corn by 0.5 MJ/kg DM, so on a 10kg DM/cow/day inclusion in a cow's diet, it can equate to approximately an extra 1 L of milk per cow.
- NDF in high chopped corn is 5% lower, meaning if corn is 30 - 50% of the cows daily intake, then it has a substantial effect on the cow to consume a lot more feed in a 24 hour period.
- No difference was found in crude protein between standard and high chopped corn.

Table 2 – Nutritional composition of standard and high chopped corn.

	Standard Chopped	High Chopped
Dry Matter Yield (t DM/ha)	18.5	17.0
Dry Matter (%)	40.4	41.4
Starch (% DM)	38.7	41.7
Starch harvested (t/ha)	7.16	7.09
NDF (% DM)	37.2	32.2
Crude Protein (% DM)	8.9	8.9
ME (MJ/kg DM)	10.8	11.3

Economic Value

- Corn is considered a high risk crop due to the high level of inputs and high potential for decreased dry matter production if agronomic management requirements are not precisely met.
- Choosing high chopped corn as a harvesting method over standard chopped corn, you reduce total yield and increase cost. However the financial gains in the improved quality of the product, and cost per kilogram of starch is improved, as outlined in Table 3.

Table 3 – Standard chopped vs high chopped corn on a value basis.

	Standard chopped	High Chopped
Cost/t DM	\$151	\$154
Cost/kg DM	\$0.15	\$0.15
Cost/kg Starch	\$0.39	\$0.37
Cost % /kg rumen degradable starch (%)	\$0.76	\$0.72

- Table 3 shows that there is little difference in the cost of the silage or the components of the silage and that at 37c/kg starch, compares well to purchased corn grain at 59c/kg starch. Both corn silage and high chopped corn silage are a better cost alternative when compared to purchased grain.
- Consider the advantages of using high chopped corn when constructing a diet in Table 4.

Table 4 – Comparison of diets using high chopped and standard corn silage (modelled on a 25L cow).

Feed	TMR – High chopped corn DM	TMR – Standard corn silage DM
Corn silage	-	5.3
High chopped corn silage	9.0	-
Barley grain	1.76	5.5
Soybean silage	3.5	3.5
Lucerne hay	2.48	2.48
Soybean meal	1.34	1.3
Canola meal	1.40	1.4
Urea	0.02	0.02
Minerals	0.5	0.5
Total	19.5	19.5
Cost (cow/day)	\$5.21	\$5.81
F:C Ratio	75:25	56:44
Potential milk yield (L/cow)	25.7	25.2
Potential MOFC @ 55 c/L	\$8.92	\$8.05

- High chopped corn reduces the need for purchased grain as more high chopped corn silage can be fed compared to standard corn silage. This can lead to an improved margin over feed cost.

Table 5 – Comparison of corn silages to other starch sources.

Feed	Starch % DM	Yield t DM/ha	As fed \$/t	\$/kg Starch
HC Corn Silage	41.7	17.0	64	0.37
Corn Silage	38.7	18.5	61	0.39
Corn grain purchased	66.3	-	350	0.59
WS Headlage	51	7	77	0.25
WS Silage	33	13	42	0.30
Forage Sorghum Silage	12	17	40	0.98
Sorghum Grain	68	-	320	0.54

*HC – high chopped; WS – White sorghum

- High chopped corn silage is a cost effective source of starch at \$0.37/kg.
- All forms of corn silage are best suited to farms with plentiful irrigation.
- Home grown high chop and standard corn silage will both always be a more cost-effective option than purchased grain.
- In situations where water is limited, sorghum headlage or silage may be better suited.



Scan this QR code for links to C4Milk financial analysis.

Contacts

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