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Circularity practices and environmental sustainability: The use of bakery by-products in feed ratio of dairy cows in a challenging year

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Introduction

In the last months, dairy farms suffered for severe crisis due to **economic speculation** and **climate change**, which are challenging the sustainability of milk production. In particular, rising raw material prices, drought and the presence of mycotoxins in corn have prompted dairy farms to make changes in the feed ration composition of lactating cows.

The aim of the study was to compare the global warming potential (GWP), related to the milk production and to the lactating cows ration, of a farm that switched from a control diet (C) to a circular one, with **bakery by-product** (B).

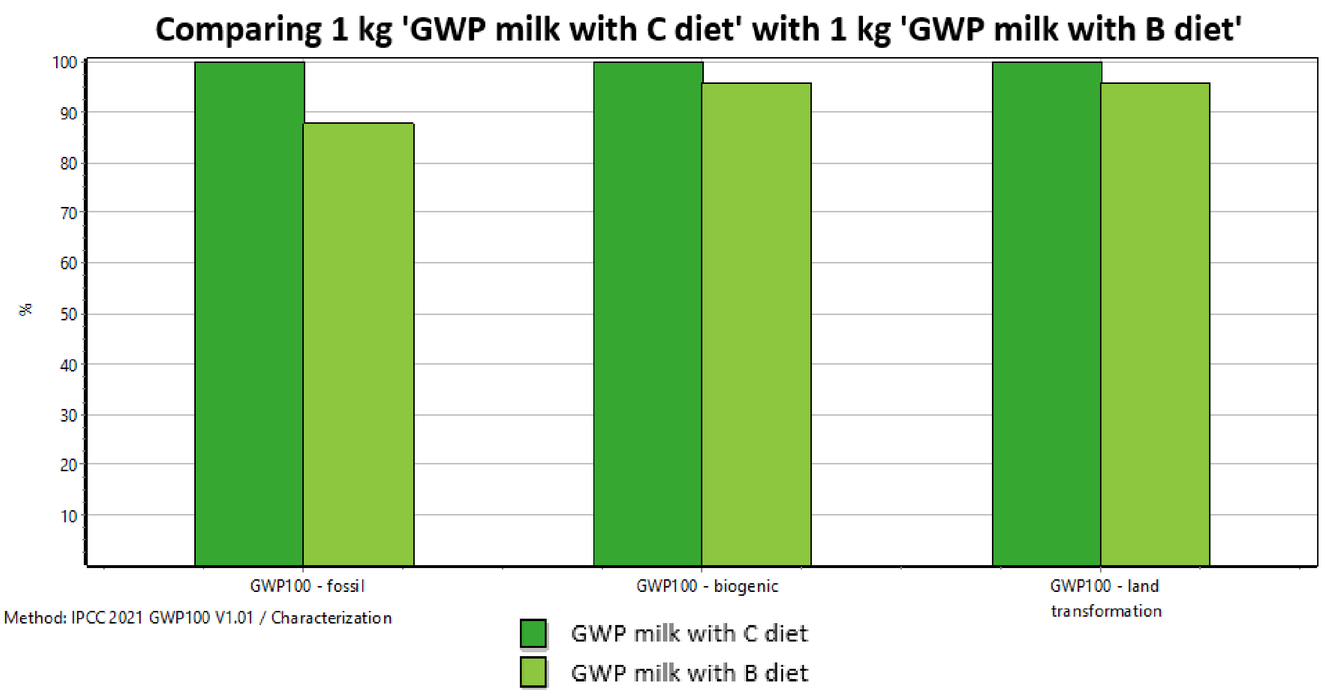
Materials and Methods

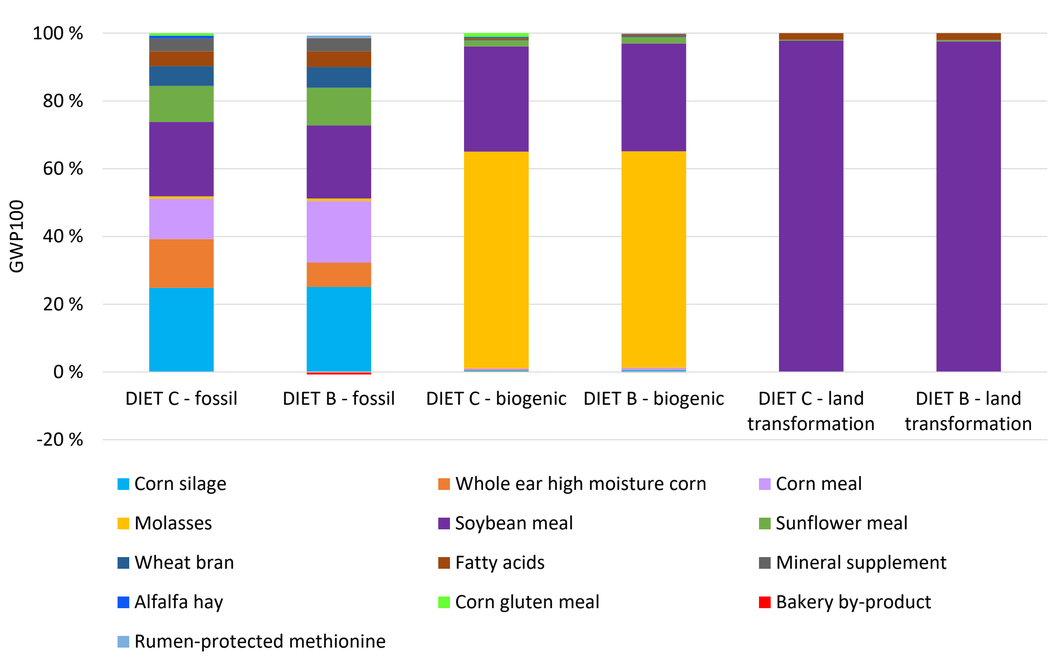
The data were collected on a farm located in the Po plain Valley, near Brescia.

The GWP of one kilogram of fat and protein corrected milk (FPCM) and of individual daily diet were calculated with **Life Cycle Assessment** approach by using **Simapro** software.

RATIONS COMPOSITION

Ingredients (kg AF/head)	Control Diet	Bakery by-product diet
Corn silage	30.0	29.0
Grass hay	9.00	9.20
Whole ear high moisture corn	6.30	3.00
Corn meal	1.50	2.20
Soybean meal	3.13	3.07
Alfalfa hay	1.50	0.00
Bakery by-product	0.00	1.80
Sunflower meal	1.64	1.61
Molasses	1.40	1.30
Wheat bran	0.83	0.78
Mineral supplement	0.67	0.66
Corn gluten meal	0.43	0.00
Rumen-protected methionine	0.00	0.03
Fatty acids	0.30	0.29





Results

The average **individual daily milk production** was higher with the B diet than with the C diet (37.5 vs 35.0 kg), also due to the change of milking system from milking parlor to automatic milking system. The **GWP of the milk** was higher for the C diet: 1.25 vs 1.19 kg CO_2eq/kg FPCM.

Comparing only the diets, the **individual daily diet GWP** (kg CO_2eq) was 19.5 and 18.3 for the C and B rations, respectively.

Conclusions

The circular diet seemed to be more sustainable, in terms of GWP, by considering the impact both per kilogram of FPCM and per individual daily diet.

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