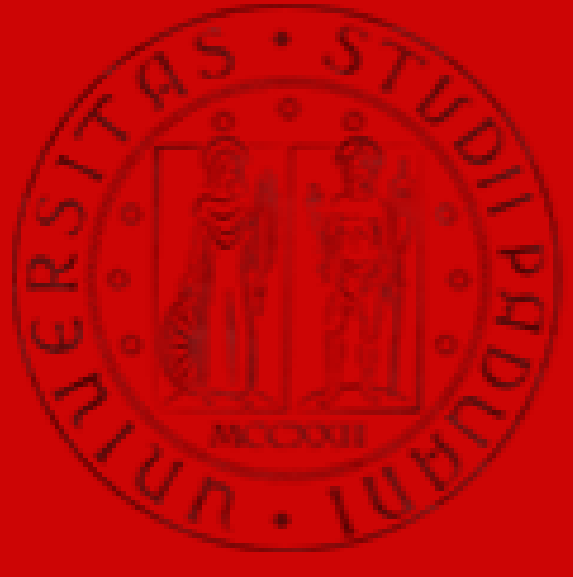


# Effects of new generation trace elements on performance of beef cattle during backgrounding phase



Martina Cortese\*, Giorgio Marchesini, Nicola Ughelini, Maria Chinello, Iginio Andrighetto

\*martina.cortese.1@phd.unipd.it

Dipartimento di Medicina Animale, Produzioni e Salute, University of Padova, Italy



## INTRODUCTION

Beef production in Italy is mainly based on the importation of young bulls, particularly from France (Cozzi et al., 2009). The first adaptation period represents a crucial moment for the achievement of an optimal performance (Castillo-Lopez et al., 2014). Farming systems in the countries of origin are mainly based on pasture and therefore animals arrive with some deficiencies, with particular regard to trace elements.

## AIM



Compare the effect of a mixture of new generation (NTC) trace element with a control mixture (CONTROL) of inorganic trace elements on performance and health of young bulls.

## MATERIALS & METHODS

**Animals:** 107 young Charolais bulls 300±53 days old and weighing on average 407±23 kg at the arrival.

**Diets:** animals were fed common diets all over the trial (ingredients: maize silage, pressed beet pulp, bran, corn meal, meadow hay first cut, soybean meal, straw). Two different trace elements supplements have been added (Table 2.). Total mixed ration (TMR) was changed after the first half of the trial to cover the increasing nutritional needs (Table 1.).

**Table 1.** Composition of the common diets.

Ration of 1 <sup>st</sup> Phase		Ration of 2 <sup>nd</sup> Phase	
Composition (% DM, Average ± St. dev.)		Composition (% DM, Average ± St. dev.)	
DM (%)	61.1±4.52	DM (%)	56.7±0.78
Ash	6.52±0.27	Price	5.85±0.17
CP	14.1±0.81	CP	14.0±0.14
EE	2.33±0.22	EE	2.63±0.10
NDF	38.2±2.17	NDF	35.2±0.62
ADF	18.4±1.34	ADF	18.3±0.50
Starch	26.1±1.33	Starch	29.8±0.79

DM, dry matter; Ash, ashes; CP, crude protein; EE, ether extract; NDF, neutral detergent fiber; ADF, acid detergent fiber.

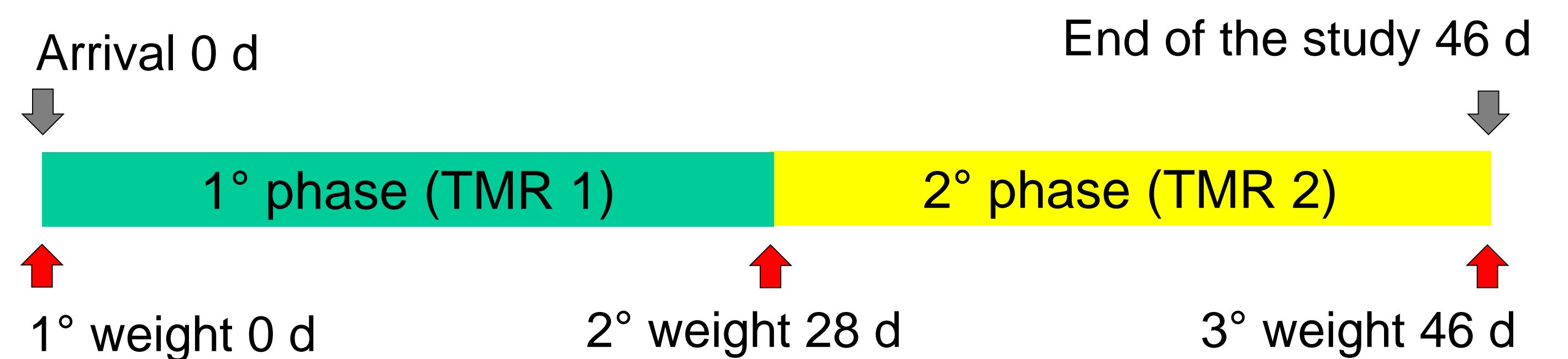
**Table 2.** Composition of the CONTROL and NTC integration.

Compounds of trace elements (mg/kg)	NTC	CONTROL
Ferrous carbonate	6985	3830
Manganese oxide		2982
Zinc oxide		5735
Zinc chelate of amino acids hydrate	5000	
Zinc monohydrate octahydroxichlorure	1818	
Pentahydrate copper sulfate		1087
Copper chelate of amino acids hydrate	700	
Trihydroxide copper dichloride	840	
Potassium iodide		36.1
Sodium selenium	5.0	18.4
Selenomethionine	1238	
Urea		80000

### Experimental design:

11 pens → 5 pens (n=47) fed common diet + **CONTROL**  
 → 6 pens (n=60) fed common diet + **NTC**

- ✓ At the arrival all the animals were individually weighed and equipped with a sensor for the detection of rumination and activity (Heatime® Pro System/HRLDn Tag, SCR Engineers Ltd., Netanya, Israel).
- ✓ The animals were further weighted after 28 days and at the end of the trial (46 days).
- ✓ Daily dry matter intake (DMI) of single pens, minutes of rumination and individual activity were checked.
- ✓ Samples of total mixed ration (TMR) and food residues were collected weekly to be subjected to chemical and physical analysis.



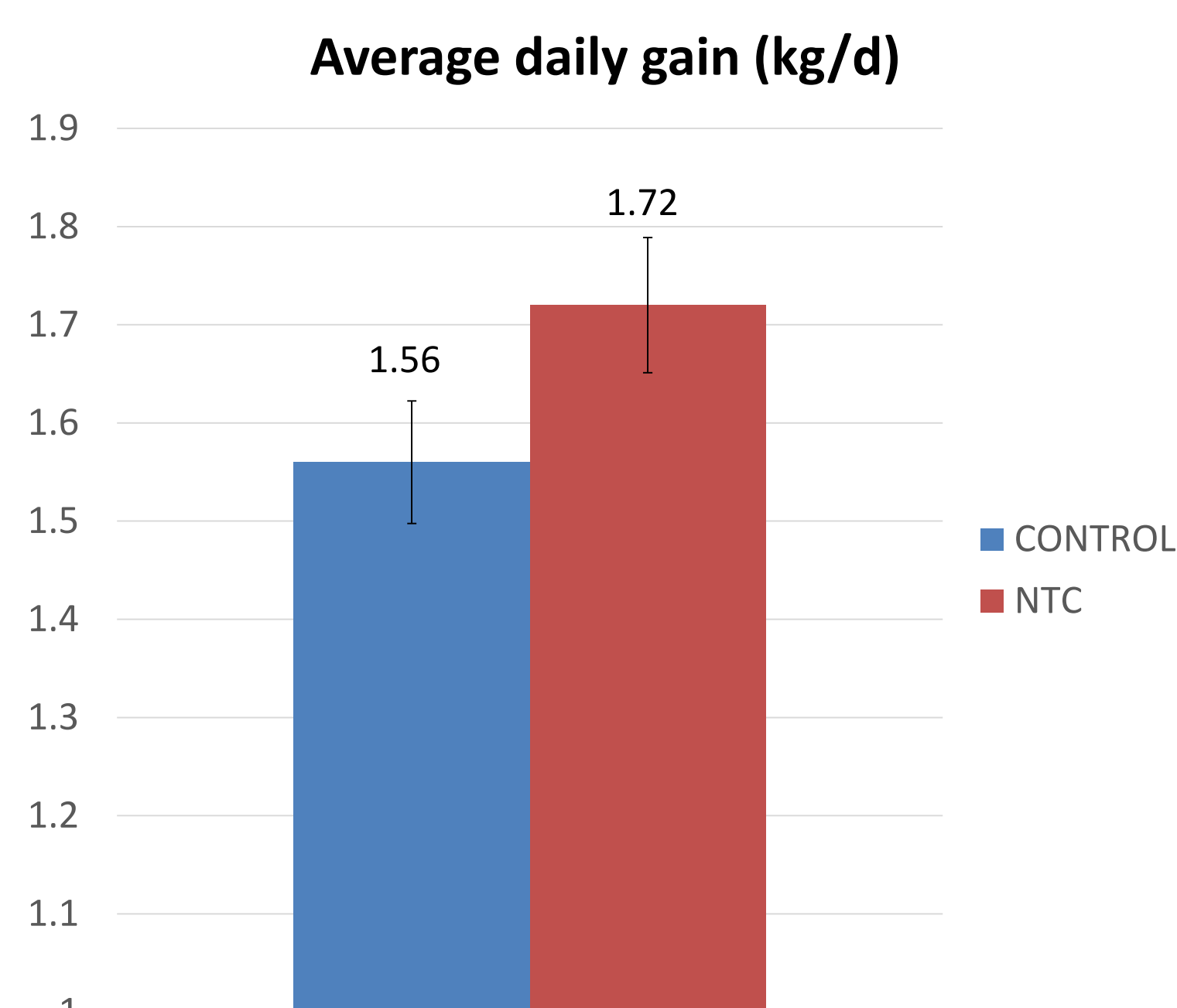
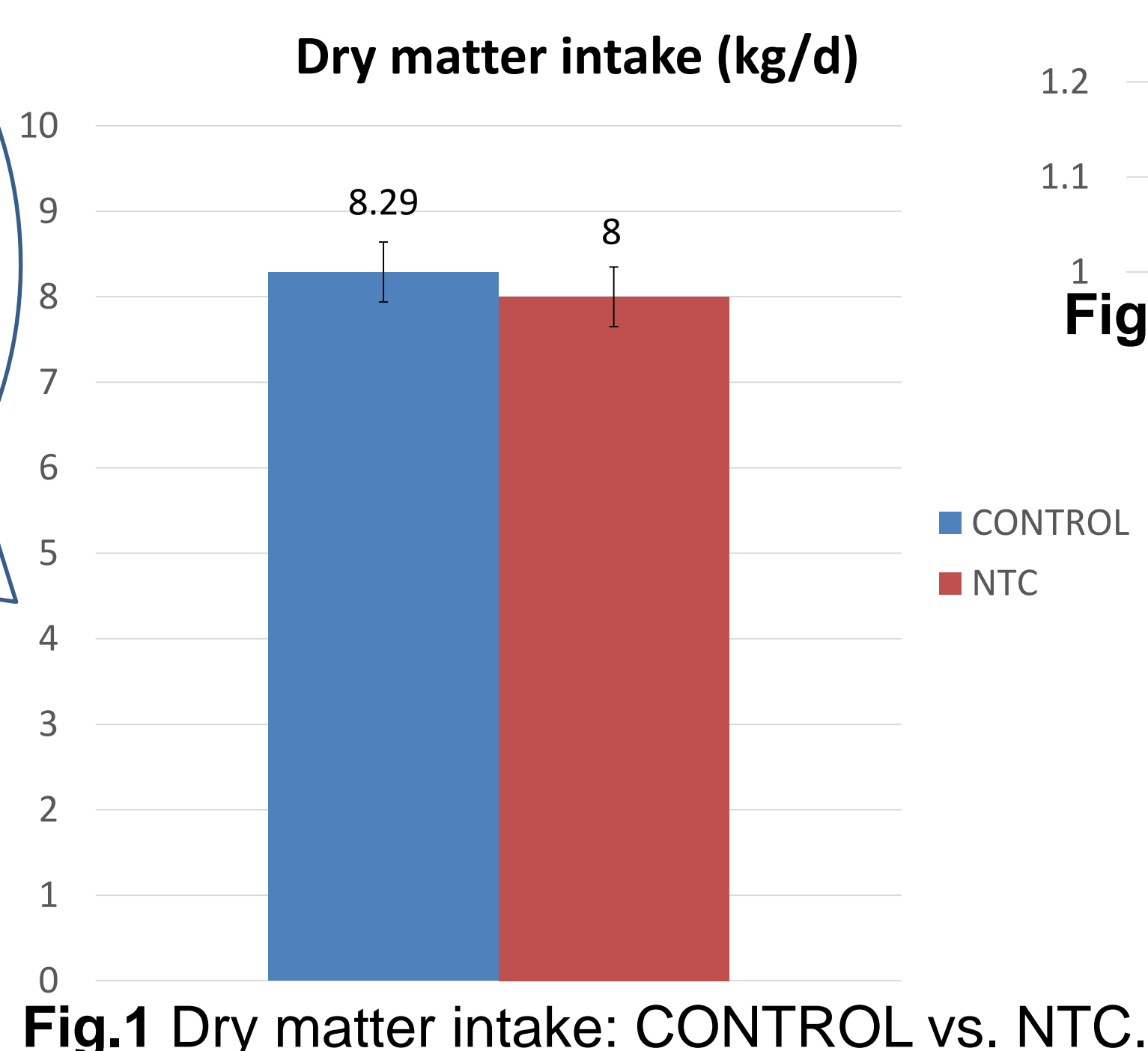
### Statistics:

Weight, average daily gain (ADG), activity and rumination time data were submitted to ANOVA. Mineral integration, pen (within diet) and period were used as fixed factors, while the initial weight was used as a covariate.

## RESULTS AND DISCUSSION

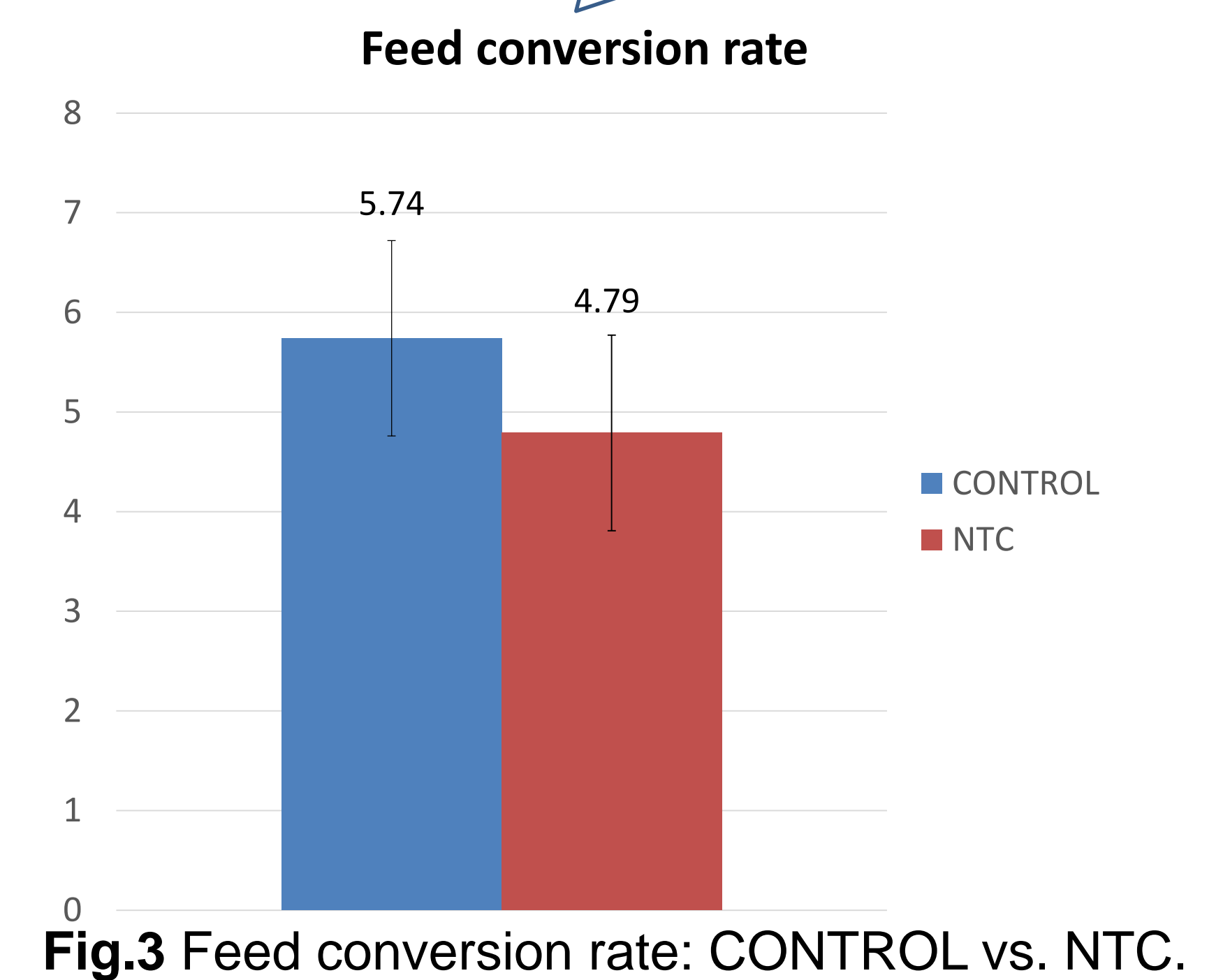


DMI was not affected ( $P = 0.567$ ) by mineral integration, showing average values of 8.29 and 8.00 kg/d for CONTROL and NTC, respectively.



NTC led to a 9% higher ADG than CONTROL (1.72 vs. 1.56 kg/d,  $P = 0.05$ ).

There were no significant differences in feed conversion rate (5.74 vs. 4.79,  $P = 0.188$ ).



No significant differences in rumination time (416 vs. 427 min.,  $P = 0.185$ ) between CONTROL and NTC, whereas daily activity was higher in NTC (415 vs. 424 bit) showing a tendency to significance ( $P = 0.085$ ).

## CONCLUSIONS

The outcomes suggest that NTC favored cattle performance, leading to a greater average daily gain (160 g) compared to the CONTROL (+ 9 %), likely because of its higher trace elements bioavailability (Genther and Hansen, 2014).