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# Effects of a standardized natural yeast-thiamine-complex in 34 dogs with tick infestation

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## Introduction

Ticks play an essential role in the spread of vector-borne diseases, therefore tick control becomes even more important (Unsicker, 2019). The increasing resistance of ticks, climatic changes with long-term effects, as well as increasing global movement of animals and goods have favored the development and spread of ticks and their diseases (Klaus et al., 2017). Also, there is an increasing interest in natural tick repellent methods due to side effects or environmental impairment of conventional medications (Benelli, 2019).

Since ticks perceive their hosts through Haller's organs, an effective natural defense approach is to prevent this perception. For this purpose topical formulations are used in many cases, but they are often perceived as unpleasant by humans or animals (Semmler et al., 2011).

A different method is based on influencing the metabolism of the skin, for example through the oral use of B vitamins. For dogs an effective natural source of B vitamins could be yeast (Shurson, 2018). A balanced natural complex of B vitamins is found in the food additive Formel-Z<sup>®</sup>, which is available for dogs and cats in Europe. Therefore, the aim of this study was to investigate the effects of the natural yeast-thiamine-complex in Formel-Z<sup>®</sup> in dogs with tick infestation within a one-year tick season.

## Methods

During a tick season of one year, dog owners had the opportunity to document the effects of the natural yeast-thiamine-complex in Formel-Z<sup>®</sup> using a questionnaire.

### Questionnaire

Information about the owner (name, address, etc.) as well as the dog (name, age, sex, coat length, etc.) was collected in the questionnaire.

The subsequent and much larger part referred to the tick infestation. In this context, the tick status (the average amount of free and attached ticks) was queried before and after the beginning of the daily administration of the natural complex. However, no differentiation of the tick species should be made.

In addition, the way of administration of the standardized yeast-thiamine-complex as well as the concomitant medication (before/after) was asked. Furthermore, the effectiveness should be assessed by the dog owners (-3 points for a major worsening to +3 points for a substantial improvement).

Lastly, occurring effects during the administration of Formel-Z<sup>®</sup> (e.g. changes in the skin and coat or adverse reactions) had to be noted.

Testing should be done for at least one month before and after the beginning of Formel-Z<sup>®</sup> application.

### Food additive Formel-Z<sup>®</sup>

The main constituent of the biological feed supplement is a dried yeast species of *Saccharomyces cerevisiae*, which is a digestible and natural source of B vitamins.

As vitamin B<sub>1</sub> (thiamine) is an essential dietary nutrient with a critical role in metabolism, Formel-Z<sup>®</sup> contains additionally 7.0 g Vitamin B<sub>1</sub> per kg dry matter as feed additive. Recent studies highlighted the importance of adequate thiamine intake in dogs and cats due to an insufficient thiamine content in pet food (Kritikos et al., 2017). In regard to the product specification, each dog should at least receive 167.85 mg of the yeast-thiamine-complex per kg body weight daily.

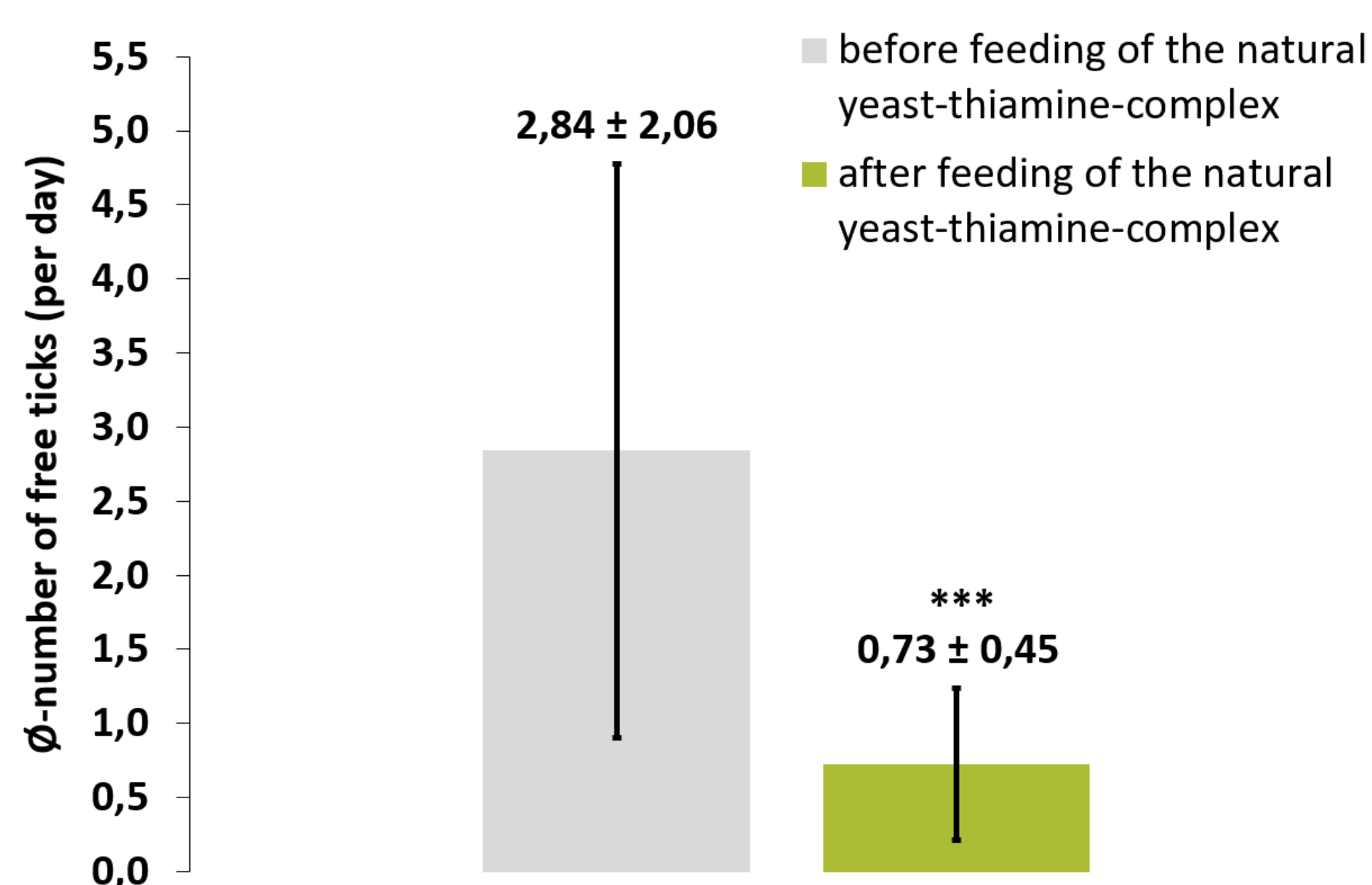
### Statistical analysis

For the descriptive statistics, the arithmetic mean (M), the standard deviation (SD) and the percentage difference of the mean values were calculated. As the tick counts cannot be assumed to be normally distributed (assessed by the Shapiro-Wilk test), the mean difference was checked for statistical significance using the Wilcoxon signed-rank test.

## Results

A total of 34 dogs of different breed could be included in this study.

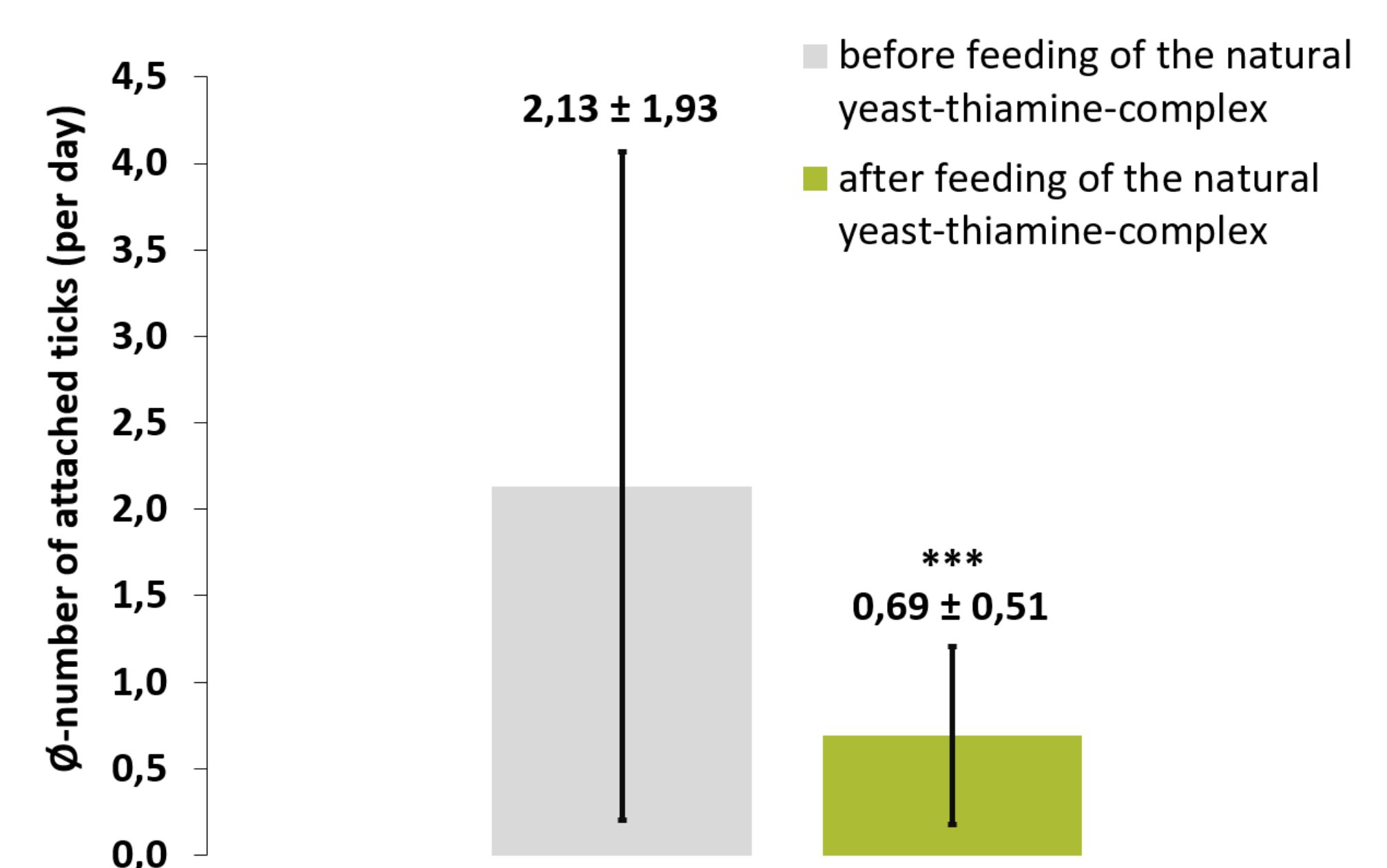
The mean body weight of the dogs was 24.03 kg. The study animals had an average age of 4.43 years. Regarding to the sex, there were 17 females and males, respectively. Gender differences could not be determined. All study animals had a fur of moderate hair length offering the ticks a possibility of penetrating through the hair and being retained on the animals.



**Figure 1:** Average number of free ticks per day (M±SD) before and after administration of the standardized yeast-thiamine-complex (Formel-Z<sup>®</sup>); \*\*\* p < 0.001

The number of free ticks on the animals was significantly reduced by 74.43% (M±SD before feeding 2.84±2.06; M±SD after feeding 0.73±0.45) after the administration of the standardized yeast-thiamine-complex (**Figure 1**).

The amount of attached ticks showed a decrease (M±SD before feeding 2.13±1.93; M±SD after feeding 0.69±0.51) by 67.62% (**Figure 2**).



**Figure 2:** Average number of attached ticks per day (M±SD) before and after administration of the standardized yeast-thiamine-complex (Formel-Z<sup>®</sup>); \*\*\* p < 0.001

In addition, 29.41% of the dog-owners reported a visible improvement of fur and skin properties of their animals, while no one reported any negative side effects. Also none of the users noticed an increase in dead ticks.

In sum, dog-owners assessed a score of 2.57 for the effectiveness of the yeast-thiamine-complex.

## Conclusion

The results provide a first evidence for the efficacy of a standardized natural yeast-thiamine-complex for the prevention of tick infestation through a potential repellent effect. This is also confirmed by the users assessment of the effectiveness of Formel-Z<sup>®</sup>. Furthermore, the multicomponent complex proved to be safe and well tolerated.

However, further studies are needed to elucidate the mode of action, which is probably based on an influence on the metabolism of the skin.

In conclusion, the standardized natural product can be a good addition to reduce tick infestation.

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