The effect of XTRACT® 7065 on performance of beef cattle is demonstrated using meta analytical tools

INTRODUCTION AND OBJECTIVES

Plant extract based feed additives are facing up some skepticism due to lack of consistency from one trial to another. This contradiction among results is attributable to small sample size, variability in trial design, heterogeneity of extracts, doses, treatment duration, etc. Therefore the global effects of XTRACT® as well as the factors influencing the animal response must be investigated. Meta analysis is the appropriate tool to answer to these questions. Therefore, the objective of this work was to evaluate the effect of XTRACT® 7065, a microencapsulated mixture of cinnamaldehyde, eugenol and capsicum oleoresin on performance of beef cattle by meta analytical tools.

MATERIAL AND METHODS

The studies selected consisted in data coming from internal trial reports. These trials were designed as randomized trials reporting the effect of XTRACT® 7065 added on top of the diet in beef cattle fed high concentrate diets. The effects of XTRACT® on feed intake, body weight gain and gain to feed ratio were evaluated.

The Mixed model (St Pierre, 2001, JDS) was used to obtain the means corrected from the random variance among trials. Then, effect size (ES) calculations were applied using the Hedge's G ES. For each outcome Forest plots displayed the 95% confidence interval of the ES.

Mean for XTRACT® treatment ..... Mean for Control treatment

$$ES = \frac{\overline{Y_{XT}} - \overline{Y_{CT}}}{S_p} * \left(1 - \frac{3}{4(n_{XT}+n_{CT})-9}\right)$$

Sample size for XTRACT®treatment ..... Sample size for Control treatment

The homogeneity of the ES distribution was addressed calculating I^2 statistic (Higgins et al., 2003). Dataset bias was assessed using funnel plots (Egger, 1997) and Begg test (Begg and Manumdar, 1994). In case of bias, Trim and Fill method (Taylor et Tweedie, 1992, Stat. Med.) was used to evaluate the number of missing studies and recalculate ES.

PRESENTATION OF THE DATASET

The review of the internal database identified 13 studies organized in 15 trials, involving a total of 980 growing beef cattle, with a mean of 28 heads per treatment (initial BW of 333 kg) and mean trial duration of 78 days. Among these trials, 10 were set up in Europe and were therefore void of ionophore, so XTRACT® was added on top of these blank feeds. The 5 other trials were performed in the USA, so the control diet contained ionophore and XTRACT® was combined to ionophore.

Basal Diet	Without ionophore	With ionophore
Treatments	Control / XTRACT®	Control / XTRACT®
Total of 15 trials	**10 trials**	**5 trials**

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RESULTS AND CONCLUSION

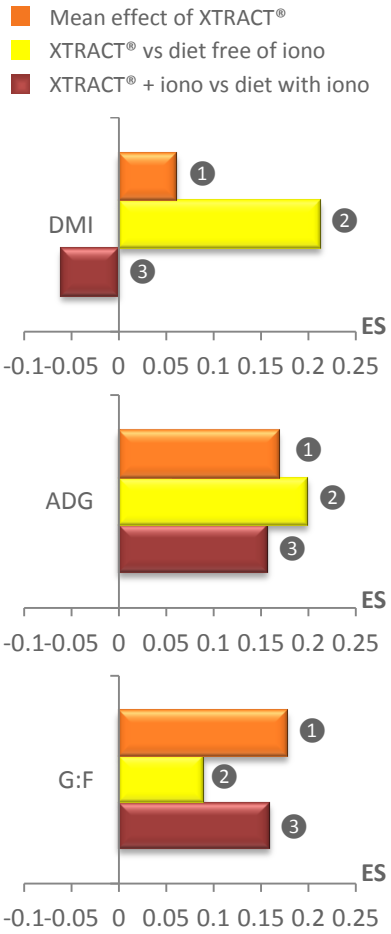
Global effect of XTRACT® 7065 on beef performance

The global effect of XTRACT® 7065 on beef performance is detailed in the following table.

	Control	XTRACT®	N	Corrected ES (95% CI)	P-value
Dry matter intake, kg/day	7.173	7.188	9	0.061 (-0.028, 0.263)	0.337
Body weight gain, kg/day	1.501	1.544	15	0.169 (0.041, 0.297)	0.016
Gain to feed ratio, g/g	21.34	21.9	9	0.178 (0.044, 0.312)	0.012

XTRACT® 7065 did not affect dry matter intake (*P* = 0.337), but significantly improved body weight gain by 2.9% (*P* = 0.016) and gain to feed ratio by 2.6% (*P* = 0.012). However, the analysis showed that the effect of XTRACT® on beef cattle was dependant of the presence of ionophore in the diet.

Effect of ionophore of the beef's response to XTRACT® 7065



The graphs presented on the left summarize the impact of the ionophore one the beef's response to XTRACT®. On the graphs, bar ❶ represents the mean effect size of all the 15 trials taken together. Bar ❷ represents the mean effect size of the 10 trials that did not include ionophore, neither in the control nor in XTRACT® treatments. At the opposite, bar ❸ represents the mean effect size of the 5 trials that did include ionophore both in the control and in XTRACT® treatments.

This shows that on the overall, ❶ XTRACT® does not affect feed intake. However, the effect of XTRACT® on intake depends on the presence of ionophore (*P* = 0.10). In the absence of ionophore, ❷ XTRACT® increases dry matter intake, while in presence of ionophore, ❸ it does not affect this parameter.

On the overall, ❶ XTRACT® improves body weight gain. Similarly, when added on top of a diet already supplemented with ionophore, ❸ XTRACT® improves body weight gain. When beef cattle are not supplemented with XTRACT® ❷, the improvement of body weight gain tends to be even higher than when there is ionophore in the diet (*P* = 0.13).

Finally, ❶ XTRACT® increases gain to feed ratio. On top of a diet already supplemented with ionophore, ❸ the effect of XTRACT® on gain to feed ratio is 78% higher than ❷ when added to a diet free of ionophore (*P* = 0.015).

This meta analysis of 15 trials demonstrates that XTRACT® 7065 improves body weight gain and feed efficiency of beef cattle. However, one must keep in mind that the presence of ionophore modulates the animal's response to XTRACT® 7065.

These results were presented as an oral at ASAS-ADSA Joint Annual Meeting, 2009. The abstract is available on request.