



## Evaluation of Garlic Treatment (*Allium sativum*) in Postmilking Teat Antisepsis

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### INTRODUCTION

Worldwide, the main dairy cattle disease is bovine mastitis, which affects milk production, and quality, and causes economic losses (Blanco and Montero, 2018). In Cuba, Ruíz Gil *et al.*, (2016) recommend studying the incidence of mastitis in the eastern region of the country, as well as the economic losses associated with the disease nationwide.

Preventing mastitis requires proper practices, such as postmilking teat sealing and disinfecting (Blanco and Montero, 2018). The antibiotics to prevent and treat mastitis are costly, and leave traces in the milk, so Ruíz Gil *et al.* (2016) recommend natural and alternative treatments.

Using garlic as a postmilking teat sealant is a successful referent of this study (Charquero, 2016; Solari, 2016) to prevent sub-clinical mastitis.

### DEVELOPMENT

The research was done at Los Naranjos cattle farm No. 026, municipality of Caimito, Artemisa province, between April 1 and May 12, 2018.

Out of 47 Jersey cows, 21 individuals having 2-5 calvings, with 5.7 l of milk produced per cow through mechanical milking, and identical management and feeding conditions, were selected. Three groups of 7 cows were made (28 quarters each), without clinical signs of mastitis. At the end of milking, 5 mL of sealant were applied as follows:

**Group 1:** (control): distilled water was used as sealant in the 28 quarters.

**Group 2:** 30% garlic solution was used as sealant in the 28 quarters.

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**Group 3:** 1% Iodine povidone was used as sealing in the 28 quarts.

The garlic solution at 30% was prepared in the dental laboratory of Bauta municipality, by crushing 30 grams of garlic (*Allium sativum*) pulp in 70 ml of mineral oil, and heating to 70 °C (Charquero, 2016), and 1% povidone iodine from 10% commercial povidone iodine, and sterile distilled water. The diagnostic of mastitis was made at 0, 14, 28, and 42 days, using the California Mastitis Test (CMT).

The transient prevalence was calculated in all the groups by sampling, and all the quarters in relation to the strong CMT positive (+++) in each group, in the first and last samplings (0 and 42 days).

The prevalence calculated was the percentage of cases with respect to the population in the period, which along with the sample size, were calculated using Epidat 3.1, according to PAHO/WHO. Software COMPROP-1 was used to compare the proportions of transient prevalence by group in each sampling, and the strong positive quarters (+++) by group, at 0 and 42 days.

In the groups where the garlic solution (*Allium sativum*) and povidone iodine were applied at 30 and 1% (respectively) as post milking teat sealant, a gradual reduction in the prevalence of sub-clinical mastitis was observed, in the samplings (Table 1).

Samplings 3 and 4 showed significant differences between Group 1 and Groups 2 and 3, respectively, with no differences between the former two groups.

**Table 1. Comparison of sub-clinical mastitis prevalence at 0, 14, 28, and 42 days**

Group	Sampling 1		Sampling 2		Sampling 3		Sampling 4	
	Prop.	Sig.	Prop.	Sig.	Prop.	Sig.	Prop.	Sig.
1	0.71	n/s	0.86	n/s	0.79	a	0.42	a
2	0.82		0.83		0.46	b	0.13	b
3	0.75		0.86		0.50	b	0.17	b

**Legend:** Unequal scripts differ significantly ( $p < 0.05$ )

**Prop:** proportion

**Sig:** significance

**n/s:** no significance

A reduction in the prevalence of sub-clinical mastitis during the study, is shown in table 2. No significant differences between the initial and final samplings (0 and 42 days) to the control group was produced, which corroborates the need of post-milking teat sealants.

The effect of the povidone iodine solution on microorganisms has been demonstrated, with a broad spectrum in final antisepsis and teat sealing (Solari, 2016); however, garlic (*Allium sativum*) preparations have shown efficacy as disinfectant and post milking teat sealant to treat mastitis in Uruguay (Charquero, 2016), and treat or prevent sub-clinical mastitis in Brazil (Solari, 2016), similar to the current study.

**Table 2. Statistical analysis of strong CMT positive quarters in initial and final samplings**

Group	Proportion		Significance
	Initial sampling	Final sampling	
1	0.33	0.29	n/s
2	0.33	0.04	**

3	0.29	0.04	*
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Legend: n/s: no significance

\* $p < 0.05$ , \*\* $P < 0.01$

Groups 2 and 3 showed differences between the initial and final results (0 and 42 days). This difference was highly significant with the 30% garlic (Group 2), which was numerically translated into greater recovery of strong CMT positive quarters (+++).

It coincides with Hanson *et al.* (2019) in the efficacy of some sealants to reduce the risk of zoonotic infections, and with Charquero (2016); Solari (2016), and Blanco and Montero (2018), who attributed the efficacy of 30% garlic to the oily excipient that keeps the active principle on the teat longer, and reduces the entry of pathogens.

## CONCLUSIONS

The oily garlic (*Allium sativum*) solution at 30%, used as post-milking teat sealant, has a similar effect to the 1% povidone iodine solution on the prevalence of sub-clinical mastitis, and might be used on dairy farms successfully.

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## AUTHOR CONTRIBUTION

Conception and design of research: AGD, YESF, ALV; data analysis and interpretation: AGD, YESF, ALV; redaction of the manuscript: AGD, YESF, ALV.

## CONFLICT OF INTERESTS

The authors declare no conflict of interests.