VIII INTERNATIONAL SYMPOSIUM ON ANIMAL BIOLOGY OF REPRODUCTION
19 to 22 – October 2021

Effects of supplementation of different concentrations of eugenol in maturation medium on bovine oocyte oxidative status and parthenogenetic embryonic development

L.R.M. Oliveira[1]*, L.V.C. Aquino[1], M.V.O. Santos[1], V.J.F. Freitas[2], L.M. Bertini[3], A.F. Pereira[1]
[1]Laboratory of Animal Biotechnology, UFERSA, Mossoró, RN, Brazil; [2]Laboratory of Physiology and Control of Reproduction, UECE, Fortaleza, CE, Brazil; [3]Federal Institute of Rio Grande do Norte, Apodi, RN, Brazil
*E-mail: lharagirs@hotmail.com

INTRODUCTION

In vitro embryo production requires competent oocytes for embryonic development. This competence can be acquired during the *in vitro* maturation (IVM); however, at this stage, oocytes may be exposed to oxidative stress. In this context, eugenol, considered a bioactive compound with a role in reducing oxidative stress, could be used in bovine IVM.

OBJECTIVE

To evaluate the antioxidant effect of different concentrations of eugenol on bovine levels of reactive oxygen species (ROS) in matured oocytes and parthenogenetic embryonic development (**Fig. 1**).

MATERIAL AND METHODS

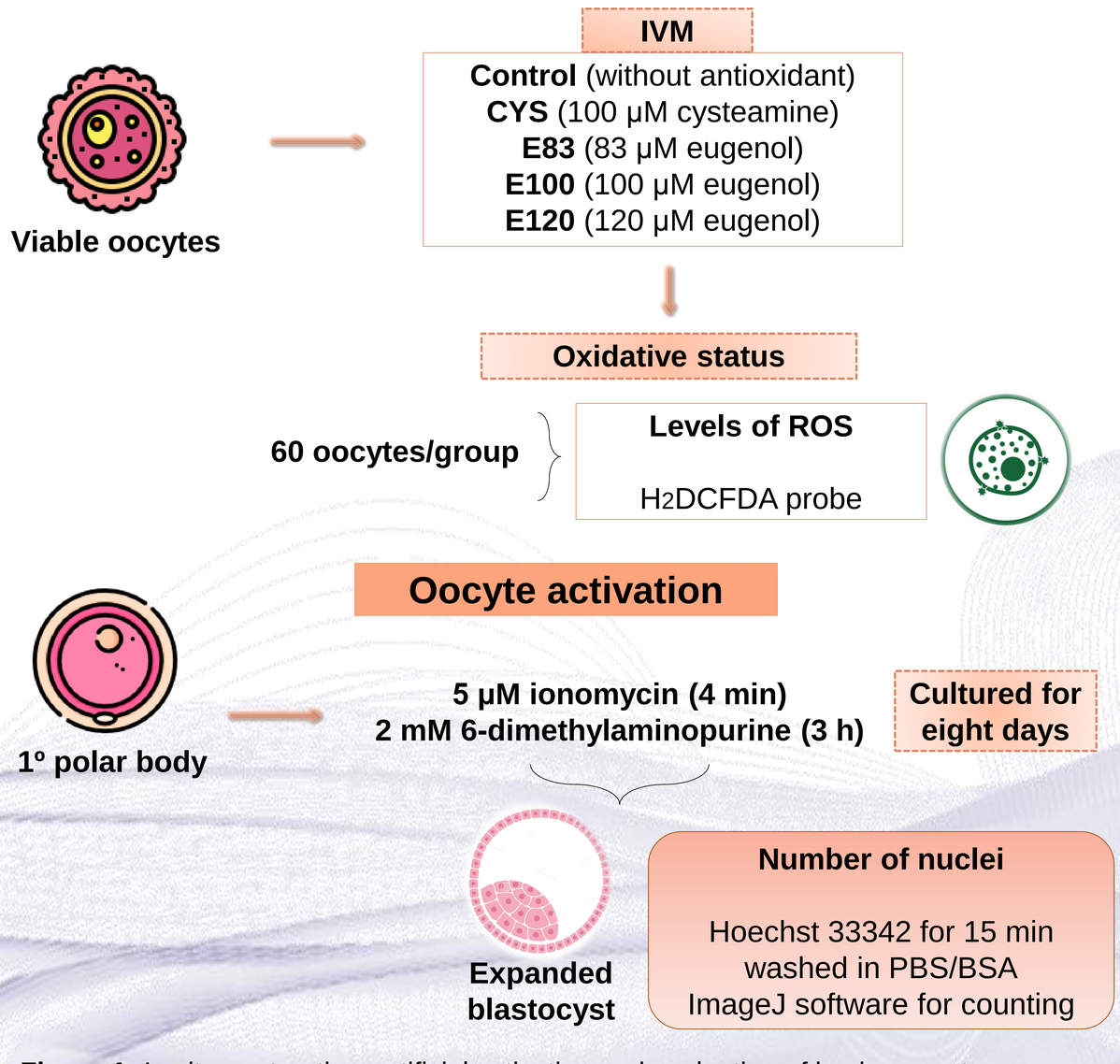

Figure 1. *In vitro* maturation, artificial activation and evaluation of bovine oocytes.

RESULTS AND DISCUSSION

A total of 193 ovaries were used to acquire 790 viable immature oocytes (4.1 viable oocytes/ovary) that were selected and distributed in eight repetitions. Initially, ROS levels were lower ($P < 0.05$) in E83 and CYS groups in comparison with oocytes matured in E100 and E120. All treatments had better results than the control (**Fig. 2**).

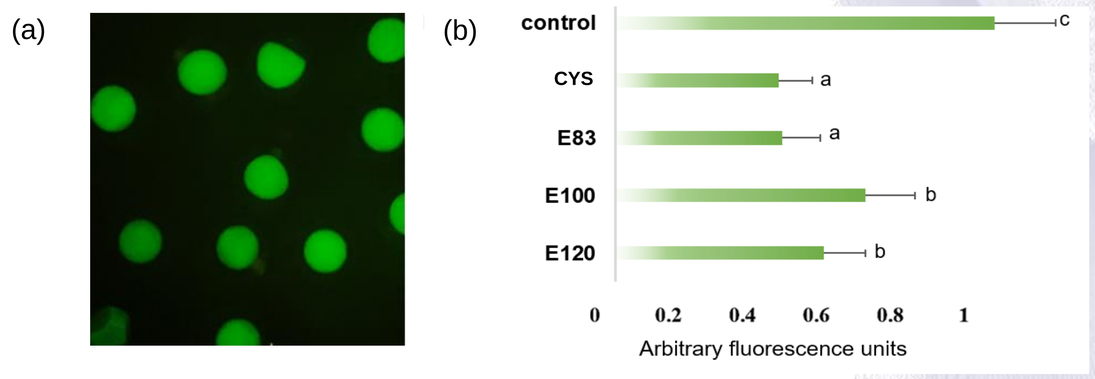

Figure 2. Evaluation of ROS levels in bovine oocytes. **(a)** Representative image of oocytes stained with H_2DCFDA. **(b)** Mean values of intracellular concentration of ROS of bovine oocytes matured with different concentrations of eugenol ($P < 0.05$).

The cleavage rate on D3 was similar among all groups, ranging from 69.5% to 79.0%. On D8, the percentage of blastocyst/total oocytes was higher in oocytes matured in E83; however, it was also similar to the CYS and E120 treatments. Moreover, E83 improved the blastocyst/cleavage oocyte rates on D8 compared with the control and E100 and the effects were similar to the CYS and E120 (**Table 1**).

Table 1. Effect of different concentrations of eugenol added to the IVM medium on embryo development of bovine oocytes.

Group	Cleavage D3 (% ± SE)	Blastocyst D8 (% ± SE)	Blastocyst/Cleaved (% ± SE)
Control	79.0 ± 4.8^{a} (64/81)	18.5 ± 4.3^{b} (15/81)	23.4 ± 4.6^{b} (15/64)
CYS	69.5 ± 7.5^{a} (48/69)	26.0 ± 6.0^{ab} (18/69)	37.5 ± 8.5^{ab} (18/48)
E83	70.8 ± 10.4^{a} (57/87)	32.2 ± 9.4^{a} (40/87)	47.3 ± 8.2^{a} (27/57)
E100	74.6 ± 8.7^{a} (56/75)	18.6 ± 7.3^{b} (14/75)	25.0 ± 5.0^{b} (14/56)
E120	73.3 ± 14.2^{a} (55/75)	22.6 ± 5.0^{ab} (17/75)	30.9 ± 9.9^{ab} (17/55)

^{a,b}: $P < 0.05$. SE, standard error.

Additionally, 83 µM of eugenol promoted better embryo quality (128.9 ± 6.2 nuclei/blastocyst) when assessed by the comparison of cell counts in relation to the control (90.3 ± 7.1 nuclei/blastocyst) and E120 (102.0 ± 8.8 nuclei/blastocyst). The CYS (111.1 ± 12.4 nuclei/blastocyst) and E100 (108.2 ± 8.0 nuclei/blastocyst) were like all groups ($P > 0.05$).

CONCLUSION

The use of the eugenol with a defined concentration of 83 µM can yield more positive results for IVEP in cattle, thus increasing the efficiency of the technique.

CAPES
CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico