# BISPHENOL A (BPA) INCREASES OXIDATIVE STRESS ON *IN VITRO*-MATURED OOCYTES AND IMPAIRS BOVINE EMBRYO PRODUCTION

**B.G.R.N. Biscola[1], A.B. Giroto[1], F.F. Franchi[2], S.G. Nunes[3], L.O. Mendes[1], W.R. Scarano[4], A.C.S. Castilho[1*]**

[1]Programa de Pós-Graduação em Ciência Animal, UNOESTE, Presidente Prudente, SP, Brasil; [2]Dipartimento di Scienze Veterinarie per la Salute, la Produzione Animale e la Sicurezza Alimentare dell Università Degli Studi di Milano, Milão, Itália; [3]Programa de Pós-Graduação em Farmacologia e Biotecnologia, UNESP, Botucatu, SP, Brasil. [4]Instituto de Biociência, UNESP, Botucatu, SP, Brasil.

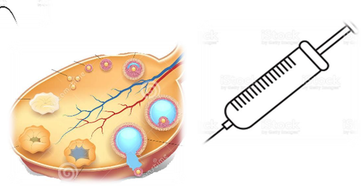
***E-mail: castilho.anthony@gmail.com**

## INTRODUCTION AND OBJECTIVE

Bisphenol A (BPA) is a monomer widely used in the plastic industry for production numerous consumer products is a endocrine disruptor and is associated with serious effects capable of affecting the reproductive systems, due to its binding to estrogen receptors (ERs). Exposure to this chemical is ubiquitous, and occurs mostly via the oral, respiratory, and dermal routes in human and animals. Animal studies have shown that BPA cause meiotic abnormalities, acting on the spindle disorganization in oocytes and on the alignment of the chromosomes, decreasing the percentage of oocytes that progress to metaphase II and increasing the percentage of oocytes that degenerate during *in vitro*. Based on that, here we aimed to investigate the effects of BPA during oocyte *in vitro* maturation on oxidative stress and the subsequent impact on early *in vitro* embryo development in cattle.

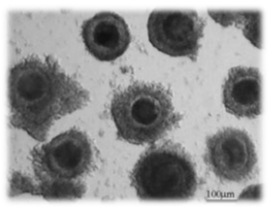
## MATERIAL AND METHODS

**Slaugthered cows**



Aspirated 2–8 mm follicles

**I V M** 24 h

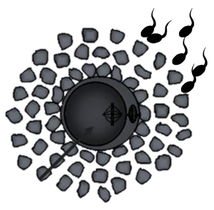


**Treated**

Base medium with 1000 µM BPA

5 Replicates

**I V F** 18 h



**Matured COCs were fertilized and the probable zygotes were *in vitro* culture**

**I V C** 7 d

***In vitro* culture**

Blastocysts production

**ANALYSIS**

- CellRox
- MitoTracker
- Hoesht
- Embryo yeild

**STATISTIC ANALYSIS**

The effect of 1000 µM BPA was tested by unpaired T-test. Differences were considered significant when P < 0.05

## RESULTS

We figure out that 1000 µM of Bisphenol A during *in vitro* maturation oocyte increase the oxidative stress (P<0,05) compared to control group.

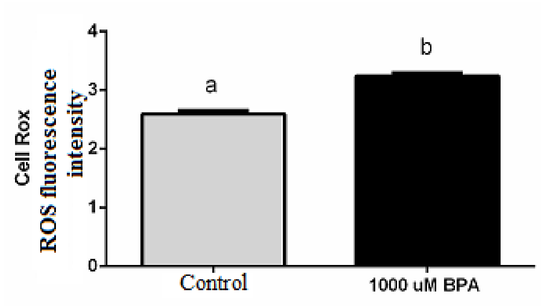



**Figure 1.** Effect of BPA on oxidative stress in in vitro matured bovine oocytes.

None oocyte reached to metaphase II (Figure 2), high levels of mitochondrial membrane potential (Figure 3) and there was no embryonic development (Figure 4) due to cell damage and toxicity the BPA.

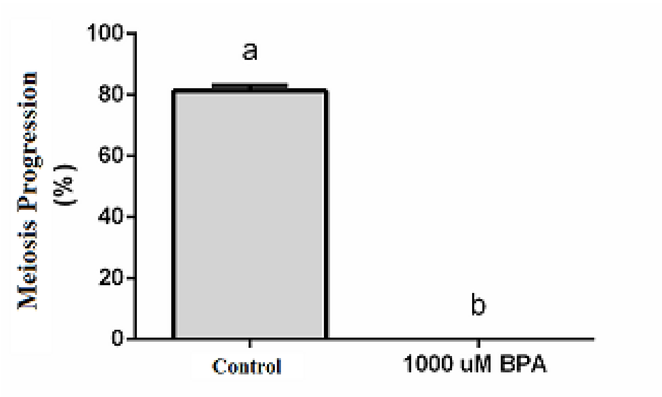



**Figure 2.** Effect of Bisphenol A (BPA) on meiotic progression to metaphase II.

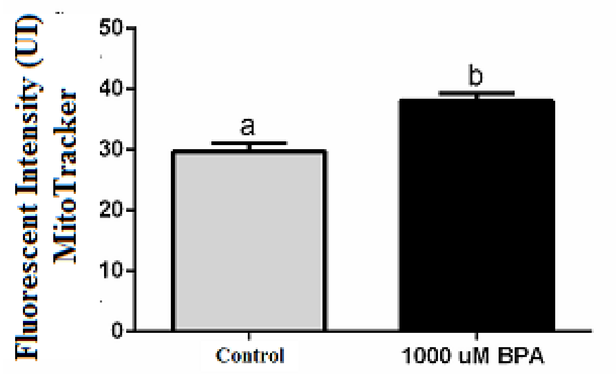



**Figure 3.** Fluorescence analysis of MMP after 1000 µM BPA treatment in oocytes bovine. BPA-treated cells were stained with MitoTracker Red mitochond

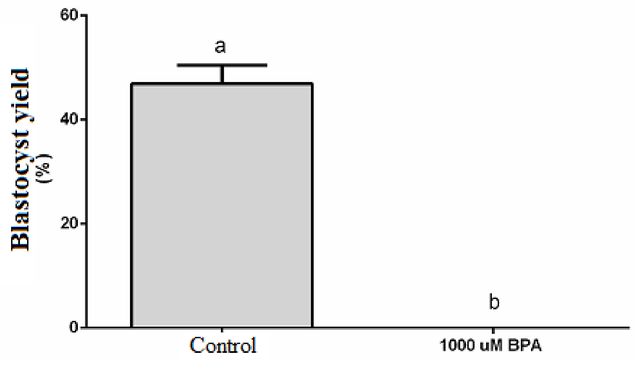



**Figure 4.** Effect of Bisphenol A (BPA)on in vitro embryo production.

## CONCLUSION

We concluded that the addition of 1000 µM of BPA during oocyte *in vitro* maturation blocks meiotic resumption and increases oxidative stress in bovine oocytes, which led to the impediment of *in vitro* development of bovine embryos.

CNPq Grant: 140620/2020-6