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## INFLUENCE OF RESVERATROL ON THE REPRODUCTIVE CAPACITY OF ANIMALS

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Resveratrol was first isolated in 1939 from the roots of *Veratrum grandiflorum* O. Loes belongs to the polyphenolic phytoalexins of the stilbene family. This substance is present in grapes and wine, as well as in peanuts, soybeans, some types of berries and tea (Breuss et al., 2019; Pyo et al., 2020; Shetty et al., 2023). The basis for the use of resveratrol in veterinary reproductive medicine is its structural and functional homology with estrogen, which allows it to bind to nuclear estrogen receptors and regulate their activity (Horgan et al., 2019; Vašková et al., 2023; Koshevoy et al., 2024).

Resveratrol is a natural aryl hydrocarbon receptor antagonist and can modulate inhibition of NF-κB, cyclooxygenase, and lipopolysaccharide to reduce inflammation and ROS levels (Dull et al., 2019). It can also modulate ovarian function by influencing oocyte maturation and steroidogenesis, protect oocytes from aging, by activating the sirtuin-1 gene (Nishigaki et al., 2021). Activation of sirtuin-1 leads to an increase in luteinizing hormone and activation of gonadotropin-releasing hormone receptors in the ovaries, stimulates mitochondrial activity to increase antioxidant potential. It has also been shown that resveratrol can modulate down-regulation of inflammatory gene expression similar to insulin-like growth factor 1 (Novakovic et al., 2022).

Under the influence of resveratrol, hepatocyte growth factor is expressed in the peritoneal fluid of females with endometriosis, which inhibits prostaglandin F<sub>2α</sub>, which induces uterine contraction,

leads to relaxation of vessels and, thus, improves blood flow and reduces ischemia (Novakovic et al., 2022; Markowska et al., 2023). On the other hand, it has an anti-decidual effect on the endometrium, and thus resveratrol supplementation should be avoided during the luteal phase and pregnancy (Ochiai & Kuroda, 2019). In humans with polycystic ovary syndrome, administration of resveratrol significantly reduced total testosterone (Banaszewska et al., 2016). Resveratrol added to the nutrient medium during oocyte culture *in vitro* increased blastocyst formation, reduced oxidative stress in mice, and improved oocyte maturation and embryo development (Wang et al., 2018; Herrero et al., 2023; Liang et al., 2023).

Data on the effects of resveratrol on male sexual function are limited. Available *in vivo* studies are conflicting regarding the effects of resveratrol on sperm quality (Koshevoy et al., 2022; Cannarella et al., 2024). Note that further research is needed to fully understand the role of resveratrol in the treatment of male idiopathic infertility (Illiano et al., 2020; Koshevoy et al., 2021). On the other hand, *in vitro* studies have proven the ability of resveratrol to protect sperm from damage during cryopreservation (Mendes et al., 2022). Other *in vitro* studies have reported positive effects of resveratrol in fresh samples and protective effects in cell lines (Francisco et al., 2022). Therefore, the use of resveratrol *in vitro* before sperm cryopreservation is an effective element of protecting them from temperature shock, and the expediency of its introduction *in vivo* for the correction of infertility in males requires in-depth research.

Thus, resveratrol as a compound in its chemical structure is characterized by structural and functional affinity with the female sex hormone – estrogen, and thanks to the ability to bind to its receptors, it can regulate them, contributing to the maturation of oocytes, improving steroidogenesis, and positively influencing the sexual function of females. The antioxidant properties of resveratrol ensure the effectiveness of its use in cryopreservation of sperm, however, the possibility of its use to improve the quality of sperm when injected into the body of males requires detailed study.

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## **ON-FARM DETECTION OF LOW-FERTILITY RAMS: IMPLEMENTATION OF TESTICULAR ULTRASOUND/ECOTEXTURE, SPERMIOGRAM AND BACTERIOLOGY IN SEMEN**

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**Introduction.** Small ruminants are an important sector in Spain, being Asia the main productive continent jointly with Africa. These animals have seasonal reproduction, and it is absolutely important the reproductive successful in order to reach optimal production (milk, meat, etc). In relation to the male's ability for reproduction, it should be checked, but it is not always carried out on farm. Different