DOTTORATO DI RICERCA IN SCIENZE VETERINARIE

30° CICLO

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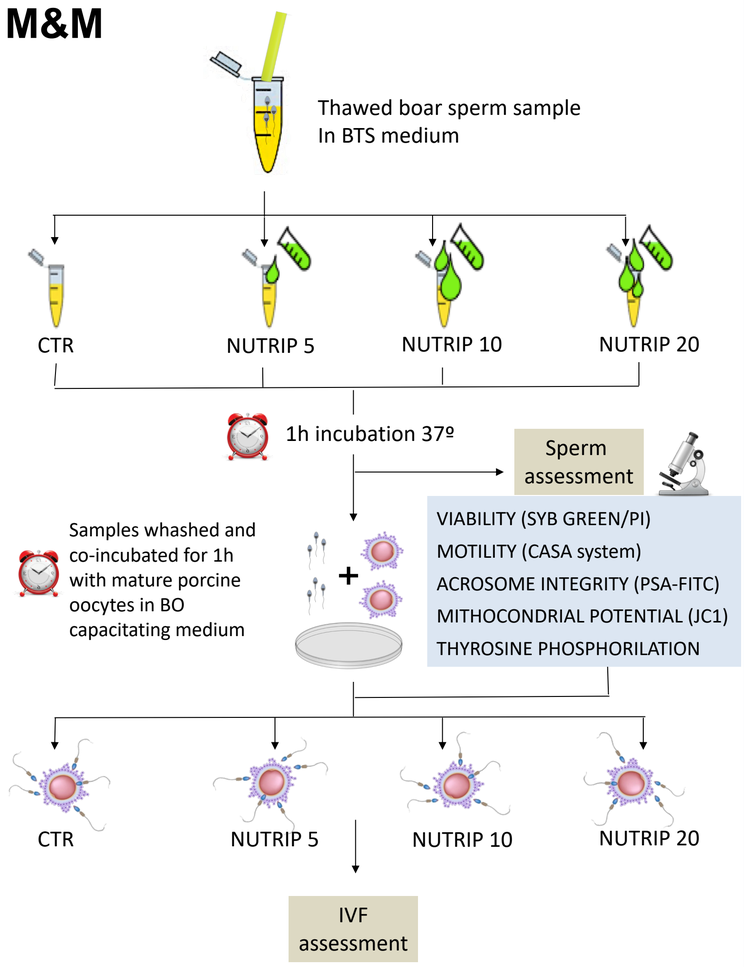
SILVAFEED® NUTRI P/ENC SUPPLEMENTATION TO THAWED BOAR SEMEN IMPROVES IN VITRO FERTILIZATION

AIMS

Freezing and thawing are known to increase ROS production. Silvafeed® NUTRI P/ENC (NUTRI P) is a blend of sensory flavouring additives, rich in tannins (known to exert antioxidant activity), that is obtained by a natural extraction process. It is suitable for swine nutrition and it is proved to have positive effects on feed consumption, feed conversion rate, intestinal health and final body weight.
This study was aimed at studying the effect NUTRI P when added to thawed boar semen on sperm and IVF parameters.

M&M



RESULTS

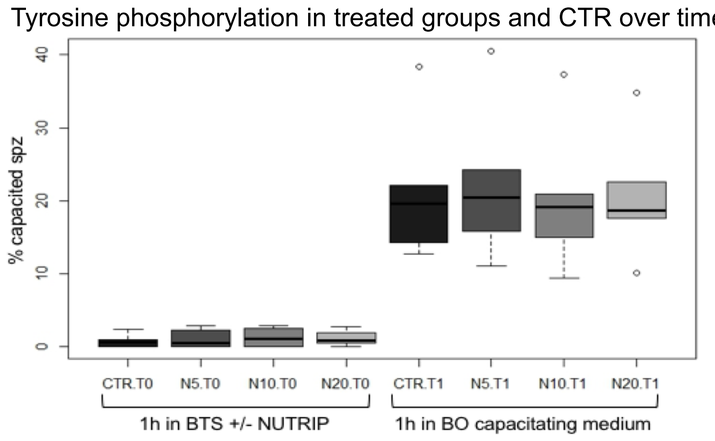
Sperm assessment did not show any effect of NUTRI P on sperm quality parameters.

Efffects of Nutri P addition to thawed boar semen on sperm parameters

	Live cells %	Acrosome integrity %	Total motility %	Progressive motility %	HMMP	BODIPY
CTR	46,4±6,1	49,0±6,5	40,5±6,5	16,3±4,3	77,9±11,5	44,5±9,2
5 µg/ml	47,4±6,7	49,7±7,8	40,3±7,4	16,7±4,1	79,0±12,4	44,4±10,2
10 µg/ml	48,9±4,4	50,1±7,3	37,8±6,7	15,5±4,0	80,6±9,3	46,0±8,5
20 µg/ml	48,1±8,0	52,7±5,2	38,0±8,3	16,2±4,3	82,6±12,8	44,7±6,5

HMMP: % of living cells with high mitochondrial membrane potential
BODIPY: lipid peroxidation of living cells membrane
(mean fluorescence intensity of BODIPY 581/591)

Tyrosine phosphorylation in treated groups and CTR over time



Our results indicate that oocytes inseminated with thawed spermatozoa pretreated with all the different NUTRI P concentrations presented a significant increase in penetration rate (number of fertilized oocytes / number of inseminated oocytes) compared to control.
In addition, 5 µg/ml NUTRI P exerted a positive effect on the total efficiency of fertilization (number of monospermic oocytes / number of inseminated oocytes).

Efffect of Nutri P supplementation to thawed boar sperm on IVF parameters

	Penetration rate %	Monospermy rate %	Total efficiency of fertilization
CTR	42,5±6,8^{a}	68,4±15,3^{a}	28,3±4,2^{a}
5 µg/ml	60,9±8,9^{b}	65,2±12,0^{a}	39,3±7,2^{b}
10 µg/ml	65,9±3,6^{b}	55,1±9,7^{ab}	36,3±6,9^{a}
20 µg/ml	70,8±8,7^{b}	42,6±13,7^{b}	29,4±7,7^{a}

Values are expressed as the mean ± SD.
Different letters indicate significant difference for P < 0.01 in column between treatments.

CONCLUSIONS

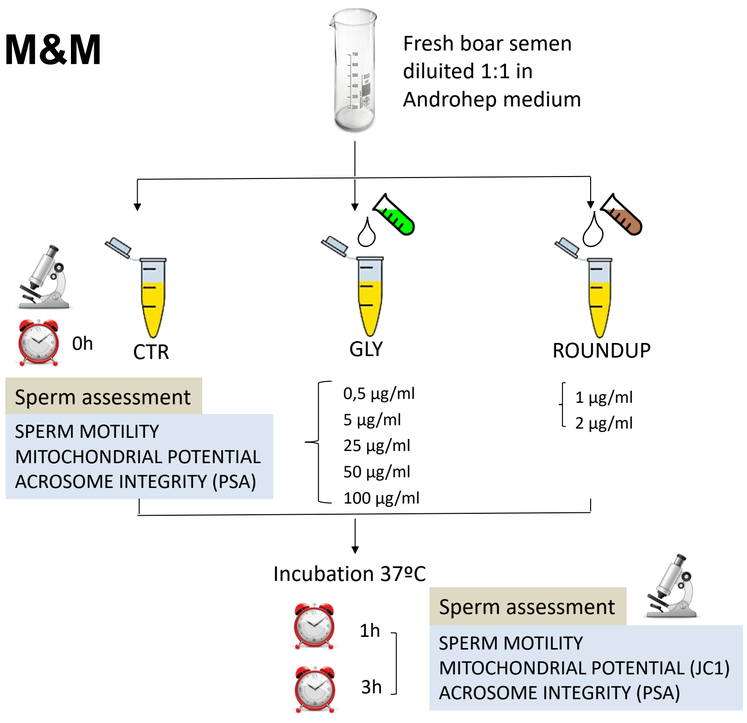
Further studies are necessary to investigate the mechanism(s) by which SNP is effective in improving IVF outcome and to determine the possible positive effect of SNP addition to commercial thawing solutions during porcine AI with frozen-thawed boar semen.

EFFECT OF GLYPHOSATE ADDITION TO BOAR SEMEN ON SPERM QUALITY PARAMETERS

AIMS

Glyphosate (GLY) is the most widely applied pesticide worldwide and it is the active ingredient of all glyphosate-based herbicides (GBHs), including the most common commercial formulation known as Roundup. The possible effects of GBHs on human health is the topic of intense public debate for its possible carcinogenic effects, neurotoxicity, intestinal and reproductive toxicity.
The aim of this study was to investigate possible effects of glyphosate and its commercial formulation (Roundup) on sperm cells.

M&M



RESULTS

Our results demonstrate that the addiction of glyphosate to boar semen has no effects on the sperm quality parameters evaluated, whereas Roundup seems to decrease the percentage of viable cells with active mitochondria and sperm motility.

Effects of GLY supplementation to boar semen on the percentage of viable cells with active mitochondria

	CTR	0,5 µg/ml	5 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml
1h	78,1±5,7	58,9±6,5	75,2±8,9	79,8±8,2	68,2±13,8	78,1±6,8
3h	77,3±3,4	75,0±5,4	75,6±7,6	76,5±6,7	74,0±1,2	83,6±9,6

Effects of Roundup supplementation to boar semen on the percentage of viable cells with active mitochondria

	CTR	1 µg/ml	2 µg/ml
1h	81,0±7,1^{a}	67,7±15,8^{b}	61,0±13,7^{b}
3h	76,0±6,4^{a}	64,5±17,3^{b}	64,1±15,2^{b}

Effects of Roundup supplementation to boar semen on motility parameters

	TOTAL MOTILITY			PROGRESSIVE MOTILITY		
	CTR	1 µg/ml	2 µg/ml	CTR	1 µg/ml	2 µg/ml
1h	40,8±12,3^{a*}	19,5±12,2^{b*}	13,1±6,4^{b*}	21,3±8,5^{a}	6,6±4,5^{b}	2,7±2,2^{b}
3h	27,8±11,3^{a*}	6,4±2,9^{b*}	3,1±2,3^{b*}	16,4±8,4^{a}	2,2±1,9^{b}	0,9±1^{b}

Values are expressed as the mean ± SD. Different letters indicate significant difference for P < 0.05 between treatments; * indicates significant difference in column

CONCLUSIONS

Further studies are needed in order to explain the mechanism by which the commercial formulation Roundup exerts its negative effect on the sperm parameter evaluated.