

Determination of Optimal Ionic and Osmotic Conditions for Activity of Spermatozoa in *Barbus sharpeyi*

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Abstract

The aim of this study was to determine the optimal levels of Na⁺, Ca⁺², k⁺, Sucrose and osmotic pressure in saline activator solutions for increasing the duration of spermatozoa motility in *Barbus sharpeyi*. Also, the effect of different saline activator solutions were assessed on VCL, VSL and Linearity of spermatozoa cells in *B. sharpeyi*. Results showed that Na⁺ ion concentration of 100 mM⁻¹, 50 mM⁻¹ of k⁺ and 2.5 mM⁻¹ of Ca⁺² have created the optimal conditions for stability of spermatozoa movement. The optimal level of osmotic pressure in sperm activator solution was 179±3.4 mOsmol kg⁻¹. Results showed that the highest VCL and VSL were assessed by 50 mM NaCl. Also, 100 mM⁻¹ of Na⁺ and 20 mM⁻¹ of Tris induced the highest Linearity percentage in *B. sharpeyi* spermatozoa (p≤0.05). In final conclusion, usage of extender solutions containing Na⁺ ion concentration of 100 mM⁻¹, 50 mM⁻¹ of k⁺, 2.5 mM⁻¹ of Ca⁺² and 150 mM⁻¹ sucrose is suggested separately for obtaining the optimal motility of spermatozoa in *Barbus sharpeyi*. Also, the mixed extender solution containing concentration 50 mM⁻¹ of NaCl, 30 mM⁻¹ of KCl, 2.5 mM⁻¹ of Ca⁺², 30 mM⁻¹ of Tris and 189 mOsmol kg⁻¹ of osmotic pressure is suggested for activation of spermatozoa motility in *Barbus sharpeyi*.

Keywords: Sperm, Motility, Ions, Osmotic pressure, *Barbus sharpeyi*.
