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Design and produce Heptad Repeat 1 (HR1) Newcastle Disease Virus peptide drug using Genetic Engineering Techniques.

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Background: Newcastle disease virus (NDV) causes a highly contagious respiratory, neurological, or enteric disease in chickens. The fusion (F) protein of virus is involved in mediating fusion of the viral envelope with cellular membranes. Heptad repeat region 1 (HR1) peptide of F protein can be used to vaccinate, immunological diagnosis and treat infected avian. As HR1 & HR2 peptide with out of equimolar concentration contains inhibitory effects on NDV entry (fusion), so they can be used to design and produce anti-NDV drugs. **Methods**: After obtaining virus from poultry we extracted NDV (NR43) RNA using RNX kit, performed RT-PCR technique, and then HR1 cDNA was cloned into pET32a(+) expression vector and transformed into E.coli Bl21(DE3) bacteria by using heat shock. The expression of the recombinant HR1 gene was induced at 30ºC temperature using IPTG in 1mM concentration. **Results and conclusion**: HR1 amino acid and nucleotide sequence was aligned usin g Blast software and deposited at GenBank (AY678224). The achieved peptide was analyzed by using SDS-PAGE and Western-Blotting techniques. Finally, our results clearly demonstrated that the gene can be cloned and expressed in vitro in high dosage and the HR1 peptide can be used as a potentially as a virus fusion inhibitor.

Keywords: Newcastle Disease Virus (NDV), F protein gene, Heptad Repeat, peptide drug

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The study of complex chemical effects of Aquagerm (Germicide) on pH of water, saprolegnia fungus, streptococcus bacteria and behavioral change of Rainbow trout.

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A highly specific and multipotential disinfectant, Aquagerm, was designed for using in aquatic farms by Research Group of Fazel Derakhshan Company (Tehran, Iran). Its effect on water pH, survival rate and behavior changes of fish as well as therapeutic effects on saprolegniasis and sterptococcosis were studied. This disinfectant reduced water pH to 2-4 units below the basal level at 1⁄100 and 1⁄200 dilutions during 30min of treatment. However, by 1⁄2000 and 1⁄2500 dilutions, pH reduction was only one unit at the same period. Interestingly, at recent dilutions pH was in optimum range which is suitable for cultivation. Furthermore, 1⁄2000 and 1⁄2500 dilutions did not cause any disorder in fish survival and behavior. This compound has bacteriostatic effect on Saprolegnia spp. in fish hatcheries. Our investigation showed that 1⁄2000 and 1⁄2500 dilutions made 82- 85 % survival of eggs in rainbow trout hatcheries. However, these dilutions were not suitable ones for reducing Streptococcus spp. to 108 bacteria per milliliter. It should be mentioned that these dilutions are too high for being used at farm condition.

Keywords: Disinfectant- PH- Rain bowTrout- Chemical material – Saprolegnia – Streptoccoccus