Bovine Herpesvirus-1 (BHV-1) is a major viral agent in cattle. BHV-1 belongs to Alphaherpesviridae subfamily and Herpesviridae family. Virus can be transmitted from latent infected animals after different factors (stress or corticosteroid applications). Different clinical symptoms in upper respiratory (Infectious Bovine Rhinotracheitis, IBR) and genital system (Infectious Pustular Vulvovaginitis, IPV; Infectious Bovine Rhinotracheitis, IBR) infections can be reported in BHV-1 infections [2]. Herpes Simplex Virus-1 (HSV-1) is a DNA virus which has a 180–250 nm diameter, and belongs to family Herpesviridae. HSV-1 is a pathogenic agent which generally affects face, ocular, mouth, central nervous systems [3]. It can be results as a latent infection such as other Herpesviruses [3].

Bovine Adenovirus-1 (BAV-1) is a major viral agent in cattle which affects both digestive and respiratory systems. BAV-1 is a double stranded DNA virus [4], and belongs to Masakadenivirus genus and family of Adenoviridae [5], not includes a papill, has an icosahedral symmetry. Nerium oleander (NO) is a member of the Apocynaceae family. NO is a toxic plant after digestion. Herpes adenovirus dilatate (NOD) and chemical extract was found beneficial to cancer, diabetes and cholesterol [6, 7]. Furthermore, NO chemical extract has antimicrobial and antifungal affinity [8, 9]. But antiviral effect of NO has not been detailed investigated. It has been reported that chemical extract of NO has no antiviral effect against Autographa Californiae nuclear polyhedrosis virus [10].

Effect of NOD against BHV-1, HSV-1 and BAV-1 is hypothesized that antiviral effect of its distillate may be determined when NO hot water distillate and different virus are used. The aim of this study was to determine the effect of NOD against BHV-1, HSV-1, and BAV-1 in Vero and MDBK cell lines in vitro.

**RESULTS**

Cytotoxicity of NOD: Over 10 mg/ml and 2.5 mg/ml concentrations of NOD had cytotoxic effects on Vero and MDBK cells, respectively. As a result 10 mg/ml and 2.5 mg/ml concentrations of NOD were used in the antiviral assays.

Antiviral activities of NOD: NOD values of designed groups are shown in Table 1. NOD showed significant (P<0.05) antiviral activity against BHV-1 and BAV-1 in MDBK and HSV-1 in Vero cells. Incubated Vero and MDBK cells treated with NOD at concentrations of 50 mg/ml and 0.01 mg/ml did not show any detectable CPE in comparison with the VC wells. No CPE was observed in NODC and CC in Vero and MDBK cell lines after 24th, 48th and 72th hr; however CPE was identified in all of BHV-1, HSV-1, and BAV-1 treated with NOD and VC.

**DISCUSSION**

Nerium oleander has a wide distribution and used for medicine [11]. NO parts and chemical extracts were investigated antimicrobial and antifungal [8,12] and antiviral [13]. In this study, although NOD had antiviral effect against BAV-1 and BHV-1 it had not against to HSV-1. NOD (50 mg/ml) was determined to be cytotoxic effect on Vero and MDBK cell lines. NOD has not toxic effect on 5 mg/ml dose in double dilutions.

NOD is same family that is Nerium indicum has antiviral activities against herpes simplex virus [14]. Whereas, NO chemical extract was any discovered antiviral activity [10]. It has been reported that NO can be used as an antifungal [8]. Also many studies have suggested that the NOD used in this study beneficial to cancer, diabetes and cholesterol in vivo studies [6, 7]. But potential antiviral effects of NOD have not yet been examined. In the present study, NOD was investigated on NOC against BHV-1 with this method. There are not enough literature information about NO and NOD that is antiviral effects. Previous study marked antileukemic effects of 1000, 500 and 50 μg/ml concentrations from each extract possess (15). In the current study, there were not determined effects of NOD against to HSV-1 but it has antiviral effect to BHV-1 and BAV-1. This information proposes that NOD can be ineffective to against HSV-1 with this method; however different methods can be tested in vitro or in vivo.

In conclusion, NOD may be useless against to HSV-1 but further studies of the activity of NOD associated with the different virus types are necessary about in vitro effects of NOD. However, NOD should test different methods and may provide useful comparative information in the future.

**REFERENCES**


**Table 1**: OD results of experiment groups (mean±SEM).

<table>
<thead>
<tr>
<th>Group</th>
<th>NO</th>
<th>Vero</th>
<th>72 hr</th>
<th>BHV-1</th>
<th>10</th>
<th>250</th>
<th>500</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.95</td>
<td>0.94</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>0.01 mg/ml</td>
<td>0.96</td>
<td>0.96</td>
<td>0.97</td>
<td>0.97</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
</tr>
<tr>
<td>0.02 mg/ml</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
</tr>
<tr>
<td>0.03 mg/ml</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
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</tr>
</tbody>
</table>

**Statistical Analysis**: Absorbance of OD values were compared by ANOVA and Duncan test as posthoc (SPSS 15.0). Test results are presented as means±SEM. P<0.05 level was accepted as statistically significant level.