Alpha Amylase Inhibition Activity of Poly Herbal Formulation (D-Scale)

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ABSTRACT

D-Scale is poly herbal formulation (capsule) is used to treat psoriasis and helps to purify blood and increase cellular immunity. Alpha-amylase inhibitors may appear to have therapeutic benefit in patients suffering from diabetes mellitus and obesity. The objective of this study was to evaluate alpha amylase activity of D-scale. In vitro alpha amylase inhibition activity of at different concentration (25 µg to 1000 µg) D-Scale was screened by 3, 5-dinitrosalicylic acid method (DNSA). D-Scale showed maximum alpha amylase inhibition inhibitory activity 73.91 % at 1000 µg/ml. Thus D-Scale may consider as remedy for diabetes and other insulin resistance related diseases; however, animal and human studies are needed to confirm this activity .D-Scale showed potent alpha amylase inhibition.

Keywords: D-Scale, Alpha Amylase inhibition activity, Dinitrosalicylic acid method.

INTRODUCTION

Amylase inhibitors are also known as starch blockers because they contain substances that prevent dietary starches from being absorbed by the body. Starches are complex carbohydrates that cannot be absorbed unless they are first broken down by the digestive enzyme amylase and other secondary enzymes. (1) Salivary and pancreatic amylases catalyze the hydrolysis of glycosidic linkages in starch and other related polysaccharides, their inhibition have been theorized to have beneficial therapeutic effects by reducing carbohydrate induced hyperglycemia and hyperinsulinemia. (2) Early studies of commercially available α-amylase inhibitory preparations failed to decrease starch digestion in humans perhaps because of insufficient anti-amylase activity. More recent research utilizing purified amylase inhibitors have demonstrated that these nutrients can rapidly inactivate amylase in human intestinal lumen in a dose dependent manner and prevent post prandial rises in glucose and insulin. (3) Essentially, it allows the carbohydrates to pass through the system possibly with less caloric intake.

D-Scale is polyherbal formulation, used to treat Psoriasis and helps to purify blood and increase cellular immunity. (4) D-Scale contains extracts of Bakuchi (Psoralia corylifolia), Khadira (Acacia catechu), Amalaki (Emblica officinalis), Nimba (Azadirachta indica), Bhringaraja (Eclipta alba), Ashwagandha (Withania somnifera), Kumari (Aloe vera), Yashtimadhu (Glycyrrhiza glabra), Pippali (Piper longum), Manjishta (Rubia cordifolia), and Guduchi (Tinospora cordifolia). The present study is to investigate alpha amylase inhibitory activity of this D-Scale by in vitro method.

MATERIALS AND METHODS

Procurment of Polyherbal Formulation

D-Scale is procured from Abhinav Health Care Products, Mumbai. Composition of D-Scale as follows: Psoralia corylifolia, Acacia catechu, Emblica officinalis, Azadirachta indica, Eclipta Alba, Withania somnifera, Aloe vera, Glycyrrhiza glabra, Piper longum, Rubia cordifolia, and Tinospora cordifolia.

Dose: 1-2 capsules twice daily

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In Vitro Alpha Amylase Inhibition Assay (3, 5-Dinitrosalicylic Acid Method)

The inhibition assay was performed according to Miller (5) using DNSA method. D-Scale of varied concentrations in 500 µl were added to 500 µL of 0.02 M sodium phosphate buffer (pH6.9 containing 6 mM sodium chloride) containing 0.04 units of alpha amylase solution and were incubated at 37°C for 10 min, followed by addition of 500 µL of a 1% starch solution in 0.02 M sodium phosphate buffer (pH6.9) all the test tubes. The reaction was stopped with 1.0 ml of 3, 5 DNSA reagent. The test tubes were then incubated in a boiling bath water for 5 min, cooled to room temperature. The reaction mixture was then diluted after adding 10 ml distilled water and absorbance was measured at 540 nm. The control samples were also prepared accordingly without any plant extracts and were compared with the test samples containing various concentrations of the plant extracts prepared with different solvents. The results were expressed as % inhibition calculated using the formula:

\[
\text{Abs (Control)} - \text{Abs (Extract)} \times 100
\]

\[
\% \text{ Inhibition activity} = \frac{\text{Abs (Control)}}{\text{Abs (Control)} - \text{Abs (Extract)}} \times 100
\]

RESULTS AND DISCUSSION

The results of α–amylase inhibition activity shown in Table No. 1. In the present study it was observed that all the concentrations (25 µg to 1000 µg) of D-Scale have shown potent α–amylase inhibition activity. The activity reveals concentration dependent nature of D-Scale with α–amylase inhibition activity shows maximum alpha amylase inhibition 73.90 % at 1000 µg/ml by DNSA method.

Drugs that inhibit carbohydrate hydrolyzing enzymes have been demonstrated to decrease postprandial hyperglycemia and improve impaired glucose metabolism without promoting insulin secretion in Non Insulin Dependent Diabetes Mellitus (NIDDM) patients. Natural health products of vegetable origin were clearly indicated as a promising avenue for the prevention of chronic diseases.(6)

Postprandial hyperglycemia is one of the risk factors associated with type 2 diabetes mellitus. Digestion of dietary starch α-amylase plays significant role in elevated blood glucose thus inhibition of amylase enzyme is very useful tool in management of hyperglycemia. (7)

Although the acute effects of α-amylase inhibitors may appear to have therapeutic benefit in patients suffering from diabetes mellitus, obesity and other insulin resistance-related diseases. Chronic administration in animal models has been shown to induce adverse effects including deleterious histological changes to the pancreas. Because it is unclear if these dietary antinutrients can elicit similar deleterious changes in the pancreatic structure and function of humans (8) the presence of α-amylase inhibitors in human foodstuffs are generally undesirable.

D-Scale contents possess antidiabetic activity Psoralia corylifolia (9), Acacia catechu (10), Azadirachta indica (11), Withania somnifera (12), Eclipta alba (13), Aloe vera (14,15), Glycyrrhiza glabra (16), Piper longum (17), Tinospora cordifolia (18) respectively. Our studies showed potent alpha amylase inhibition activity; D-Scale may be screened for in vivo anti diabetic screening.

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Table1. In vitro α- Amylase inhibition of D-Scale

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Concentration (µg/ml)</th>
<th>% inhibition</th>
</tr>
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<tbody>
<tr>
<td>D-Scale</td>
<td>100</td>
<td>10.2</td>
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<tr>
<td></td>
<td>200</td>
<td>17.39</td>
</tr>
<tr>
<td></td>
<td>400</td>
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<td></td>
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REFERENCES