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EVALUATION OF α – AMYLASE INHIBITORY ACTIVITY OF SOME NUTRITIONAL SUPPLEMENTS

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ABSTRACT

Finding out the alternative uses of the clinically proven and time tested drugs can be one of the best options for drug discovery research. In view of this the present study was carried out to evaluate α-amylase inhibitory activity of the some of the commonly used Nutritional supplements. The nutritional supplements were procured as gift samples from the market and were evaluated for in-vitro α-amylase inhibitory activity using a colorimetric assay. The results revealed that all nutritional supplements showed had pro minent α - amylase inhibitory potential in comparison to Acarbose. The drugs exhibiting prominent *in-vitro* α- amylase inhibitory activities are to be further evaluated in the *in-vivo* models so that can be used as add - on therapy in diabetes patients.

KEYWORDS: Alternatives uses of drugs, α-amylase inhibitory activity, Add-on therapy.

INTRODUCTION

Nutrition can be defined as all processes used by an adult or child to take in food and to digest, absorb, transport, utilize, and excrete food substances, components or substances found in food are called as nutrition.(Endres,1994). Nutritional supplements include vitamins, minerals, herbs, meal supplements, sports nutrition products, natural food supplements, and

other related products used to boost the nutritional content of the diet. Nutritional supplements are used for many purposes. They can be added to the diet to boost overall health and energy; to provide immune system support and reduce the risks of illness and age-related conditions; to improve performance in athletic and mental activities; and to support the healing process during illness and disease.[1] However, most of these products are treated as food and not regulated as drugs nutrition supplements contains vitamins, minerals, meal supplements and herbs. Nutritional supplement drinks are available for different purposes and different age groups children's, women's. Sport persons, disease persons, pregnancy ladies, feeding mothers.[2]

MATERIALS AND REAGENTS

Starch, 3, 5 - Dinitrosalicylic acid, Sodium Potassium tartarate, Sodium hydroxide, Sodium Dihydrogen phosphate, Sodium chloride and α-Amylase were purchased from Hi Media Mumbai. Acarbose was purchased from Sigma Aldrich, Bangalore.

NUTRITIONAL SUPPLEMENTS: Boost, Horlicks, Women Horlicks, Junior Horlicks and Kissan Nutria Gro (Glaxo smith kine, punjab), Complan Memory, Complan Nutri Gro ,Complan Kesar Badam (Heinz India pvt Limited, mumbai) Pediasure (Abbott Singapore Private Limited, singapore), Bournvita , Bournvita 5 Star (Cabdury Limited, India), Protinex Vanilla (Wock Hardt Limited, mumbai).

METHODOLOGY

Different concentrations (1µg/ml, 3µg/ml, 5µg/ml, 10 µg/ml, 30 µg/ml and 50 µg/ml) of test drug samples were prepared with Phosphate buffer. To 0.2ml of the test sample, 0.4ml of enzyme solution containing 10mg of α-amylase in 100ml of phosphate buffer pH 6.9 (20Mm sodium di hydrogen phosphate containing 6.7mM of sodium chloride) was added.

Then to the above solution, 0.2ml of buffer was added and the solution was incubated for 20 min. Then 0.2ml of starch solution (1% W/W) was prepared and boiled for 15 min and added to the mixture. It was then incubated for 5 min. The samples were prepared in triplicate. To the above solution 1ml of DNS reagent [Dinitrosalicylic acid (1.5%), sodium potassium tartarate (12%) and sodium hydroxide (0.4M) in 100ml distilled water was added.

The solution was boiled for 5min and cooled in running tap water. Absorbance was measured at 540nm (Schimadzu Spectrophotometer UV-1800).

Control was considered 100% enzyme activity and was conducted in similar way by replacing test drug with vehicle.[3, 4, 5, 6]

The results were expressed as % inhibition calculated using the formula.

$$\% \text{ inhibition} = \frac{\text{absorbance control} - \text{absorbance test}}{\text{absorbance control}} \times 100$$

The IC50 Values (inhibitory concentration at which 50% inhibition of the enzyme activity occur) of the test samples were determined by performing the assay as above with varying concentration of the test samples ranging from 1µg to 50µg/ml. the IC50values were determined from plots of percentage inhibition Vs concentration. The total experiment was done in triplication.

RESULTS

Concentration (µG/ML)	Percentage Inhibition	IC50
100	2.00	
300	4.42	
500	6.72	1508.3
1000	34.3	

α- amylase is one of the main enzymes in human that is responsible for the breakdown of starch to more simple sugars. Thus, the inhibition of this enzyme can delay the carbohydrate digestion and reduce the rate of glucose absorption. Consequently postprandial rise in blood glucose is decreased. Hence they have long been thought to improve glucose tolerances in diabetic patients. Therefore, in this study α –amylase inhibitory activity of nutritional supplements was determined. The α-amylase inhibitory potential of nutritional supplements in given in Table 1.

Basing on the percentage inhibition valves obtained the IC50 valves of nutritional supplements were calculated. The IC50 values are shown in Table 2, Fig 1.

S.No	product	100µg/ml	300µg/ml	500µg/ml	1000µg/ml	IC50
1	Protenix.Choclate	20.0	31.8	49.7	61.0	684.8
2	Protenix.Vanilla	21.8	30.2	43.8	54.0	843.4
3	Horlick.Women	26.4	37.5	51.8	59.1	660.0
4	Horlick.Junior	29.4	32.3	35.6	68.9	685.5
5	Horlick	30.1	35.6	45.2	56.4	765.8
6	Bournvita	10.0	16.2	39.6	57.4	837.5
7	Pedisure	10.0	12.5	29.5	48.1	1051.3

8	Kissansmart	29.7	30.3	33.8	46.9	1220.5
9	Bournvita 5 Star	11.9	19.2	25.8	64.0	801.3
10	Complan.Kesar.B adam	32.6	45.1	55.3	68.6	472.3
11	Complan.Memory	32.3	49.4	56.2	63.8	470.6
12	Complan. Nutri Gro	27.8	33.7	49.7	64.6	620.2
13	Maltova	21.0	25.9	35.2	68.9	770.0
14	Boost	14.1	21.8	29.3	45.4	1140.2

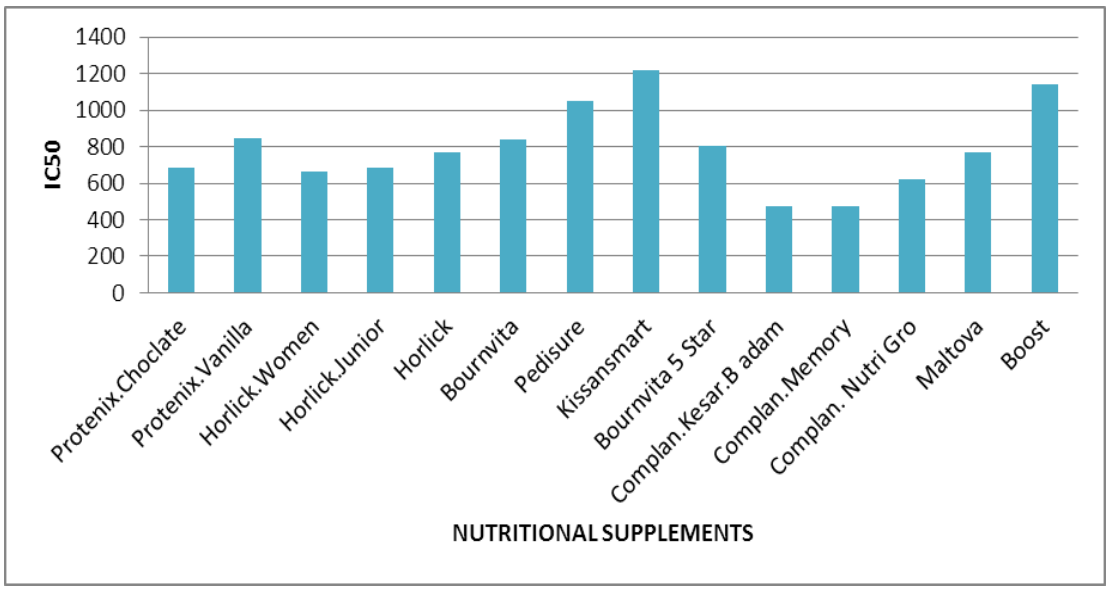

FIG 1: *α*-Amylase Inhibitory Activity of Nutritional Supplements.

The results depict that all nutritional supplements they have alpha amylase inhibitory activity but the Complan Memory, Complane Kesar Badam, Protinex and Junior Horlick showed IC50 Values less than that of the standard acarbose.

CONCLUSION

The study data suggests that these drugs may be used as add-on drugs to diabetic patients according to clinical requirements whenever polypharmacy is essential. However, the data needs further evaluation in the animal models and human volunteers.

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