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VEGETARIAN DIET, A FIGHTER IN THE PREVENTION AND OUTBURST OF VIRAL DISEASES

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ABSTRACT

Viral diseases , specially COVID-19 are menacing diseases of the day which have taken so many lives and are still now dominating the world with their devastating effects . The effects seem to be unending with waves after waves with new character and stronger attacks. The medicines and vaccines available are not promising enough, so new approaches are continuously being studied , one of which could be the proper application of diet resulting in the natural ways and applicable to the whole humanity in the universe at a time.The natural polyphenols obtainable from foods are well known to act as preventer and inhibitor of the viral diseasesThe aim of the present investigation is to see how the dietary polyphenols could play important role in achieving the goal. Thus polyphenolic treatment has been proposed . The antiviral polyphenols have been estimated from a proposed diet by evaluating their amount in each item of the diet and the accumulated values have been studied to establish their importance to combat the viral diseases with special reference to COVID-19. It is conjectured that the dietary polyphenolic treatment could combat against the viral diseases.

Key Words: Dietary polyphenols, Viral diseases, IC_{50} , GI values, Antiviral effects, Saviours of human kind and Universe.

Introduction

After the upsurge of COVID-19 virus affecting the whole world killing lakhs of people and continuous chain of unending process[1] researchers are very much at a loss to find ways out of the present situation. Covid vaccine and medicines are must to counteract the life threatening virus. Success to that effect is still under observation[2]. In this article attention has been drawn to overcome the attack by consuming nutritional food[3]. It is well known that polyphenols are good choices as antivirus elements, which can be easily obtained from vegetarian diet[4,5]. The vegetarian diet mentioned earlier [3] contains nutritional food having large number of polyphenols. Here, attention has been made to study in detail the polyphenols obtainable from the diet, their quantity and effect on human being as protectors against viral diseases, specially COVID-19 and the new strain as second wave of attack. The polyphenols of interest present in the proposed diet are:

Gallic acid, Salicylic acid, Vanillic acid, Ellagic acid, Caffeic acid, Chlorogenic acid, P-coumeric acid, Syringic acid, Ferulic acid, and from flavonoid group the important elements are: Quercetin, Kampferol, Apigenin, Luteolin, Catechin, Myricetin, Genisteine, Isorhamnetin, Anthocyanin, Proanthocyanidin and Rutin.

Materials and Methods

The proposed diet involves variety of foods containing legume, cereals, vegetables, dairy products, fruits and refreshing items. The above mentioned

polyphenols are present in the diet which are antivirus.

Evaluation of the relevant polyphenols from each element of the diet have been made and added up to get the net amount. The results so obtained are believed to act as preventive doses and sometimes as medicinal doses against COVID-19 and other viral diseases.

Results and Discussions

Polyphenols obtainable from plants, fruits, cereals and refreshing items like tea, drinks exert countless pharmacological, biological and physiological benefits for human health.

Besides the well known antioxidant and anti-inflammatory activities of polyphenols, evidence highlighted the antiviral potential of the compound[5].

A large number of studies demonstrated the efficiency of polyphenols against Epstein-Bar Virus[6,7], enterovirus[7,8], herpes simplex virus[9,10], influenza virus[11] and other virus causing respiratory tract related infections.

There is promising evidence regarding the antiviral coronavirus activity of polyphenols, automatically it may be hoped to drive the development of strategies to counteract the SARS-COV2 pandemic.

In this article the polyphenols in the proposed diet have been highlighted which have antiviral properties that could enhance the body immunity facing various viral infections including COVID-19 and the recent attack of a new strain[12,13].

It may now be interesting to present the amount of relevant polyphenols(phenolic acids and flavonoids) obtainable from

Table-1: The amount of polyphenols obtained from the proposed diet.

Polyphenols(A)	Minimum value in mgm/day(B)	Maximum value in mgm/day(C)
1. Gallic acid	37.81	40.41
2. Salicylic acid	3.71	4.15
3. Vanillic acid	13.18	20.59
4. Ellagic acid	13.26	17.45
5. Caffeic acid	33.38	41.85
6. Chlorogenic acid	24.78	32.12
7. P-coumeric acid	16.98	22.80
8. Syringic acid	12.36	21.45
9. Ferulic acid	29.34	32.07
10. Quercetin	12	15
11. Kampferol	12.25	13.22
12. Apigenin	8.32	9.32
13. Luteolin	13.60	24.83
14. Catechin	7.72	12.07
15. Myricetin	54.37	55.30
16. Genisteine	30.02	44

(A)	(B)	(C)
17. Isorhamnetin	14.74	21.19
18. Anthrocyenin	54	100
19. Proanthrocyanidin	670	715
20. Rutin	2.54	2.72

We are now in a position to calculate the mean values of the polyphenols obtained per day from the proposed diet and compare them with the daily intake amounts and the IC 50 values[14](The IC 50 value is correlated with the drug potency i.e. the amount of drug

the diet under consideration. This has been shown in Table-1 below.

necessary to produce the inhibition effect – The lower the IC 50 value the more potent the drug).

The above data are presented in Table-2 below:

Table-2

The mean values of the polyphenols obtained from the proposed diet, the daily intake amount and the corresponding IC 50 values[15-18].

Polyphenols(a)	Mean values from proposed diet in mg/day(b)	Mean values of intake amount in mg/day(c)	IC 50 values in mg(d)
1. Gallic acid	39.11	97.2	For HSV 4.065 mg SARCV- 12.16 mg
2. Salicylic acid	3.93	10	For SARC virus 1.67 mg
3. M, Vanillic acid	14.41	9[19]Q	For Influenza virus 8.4 mg

(a)	(b)	(c)	(d)
4. Ellagic acid	15.355	30	For HIV .755-30.21 For hepatic CV 38.01 mg
5. Caffeic acid	37.615	70	For HBV 11.32 For HIV 18.01 For influenza 4.34 For SARCV .6377
6. Chlorogenic acid	28.45	300	For HBV .4606 For SARCV 15.37 For influenza V 29.76
7. P-coumeric acid	19.89	17	For ResV 11.72

(a)	(b)	(c)	(d)
8. Syringic acid	16.905	4.82	For HBV .126
9. Ferulic acid	30.705	250	For CDV 0.699
10. Quercetin	13.5	40	For CDV 4.201 for RSV 2.417 for Adenovirus 2.41 for EbolaV 2.3 for Human rhino V 1.08 for Influv

			12.72 for DenguV 1.08
11.Kampferol	12.755	13.3	For RSV 8.214 for Adeno V 8.21 for SARCV 4.60

(a)	(b)	(c)	(d)
			For influenza V 286.37
12.Apigenin	8.82	6.5	for influenza virus 1.4 for RSV 6.238 for SARCV 75.83 for HEPCV .297 for African SWV 57.25
13.Luteolin	19.215	0.20	For SARCV 5.75 for African Swine V 286.45 for Zikovirus 15.17
14.Catechin	9.895	11.1	For HSV> 58.05

(a)	(b)	(c)	(d)
			For AdenoV 7.67
15.Myricetin	55.085	23-120=71.5	For Adenovirus>12.41 for RSV 12.41 for ZikoV 7.001 sor SARCV .8624 for HIV 2.41
16.Genisteine	37.01	30-60=45	For AfrSwV 3.513 for HCV .054 for InfluV 22.05
17.Isorhamnetin	17.965	20.7	For Influv 15.81 to 31.62
18.Anthrocyanin	77	64.4	For SARCV 9.26
19.Proanthrocyanidin	692.5	189	For CDV 53.2 for MAYROV 22.45

(a)	(b)	(c)	(d)
20.Rutin	3.97 to15.88	250	For CDV 8.2419 for HumanrhinoV 1.28 for DenguV 1.28 for RotaV 15.83 for ZikoV 63.49

From Table-2 it is clear that the polyphenols obtained from the proposed diet play important roles to combat so many viral diseases and it is conjectured that those polyphenols may act positively to protect against COVID-19, the pandemic disease of the days[4,20].

The column(d) of Table-2 shows the IC₅₀ values for different viral diseases. Actually, the half maximum inhibitory concentration (IC₅₀) is a measure of the effectiveness of a substance in inhibiting a specific biological or biochemical function. Usually, less than 10 micromole

concentration of a drug in plasma is accepted as a good IC₅₀ value because higher than 10 Micromole of an element inhibits the necessary enzymes.

The IC₅₀ value is correlated with drug potency, the lower the IC₅₀ value the more potent the drug (in here the polyphenols).

In Table-3 below the IC₅₀ values and the good inhibitor values for different polyphenols have been presented for comparison. The results are shown in mg by proper conversion from micromol.

Table-3

Polyphenols(a)	IC 50 values in mg(b)	Good inhibition values in mg(c)
1. Gallic acid	For HSV – 4.065 For SARC – 12.16	1.7012
2. Salicylic acid	For SARC – 1.67	1.3812
3. Vanillic acid	For InfluenzaV- 8.4	1.6814
4. Ellagic acid	For HIV- .755-30.21 For HCV- 38.01	3.02197
5. Caffeic acid	For HBV- 11.32 For HIV- 18.01 For InfluenzaV- 4.34 For SARC – .6377	1.8616
6. Chlorogenic acid	For HBV- .4606 For InfluenzaV- 29.76 For SARC – 15.37	3.5431
7. P-coumeric acid	For RSV 11.72	1.6405
8. Syringic acid	For HBV- .126	1.9817
9. Ferulic acid	For CDV- .699	1.9418

(a)	(b)	(c)
10. Quercetin	For CDV- 4.201 For RSV- 2.417 For AdenoV- 2.41 For EbolaV- 2.3 For HumanRv- 1.08 For InluV- 12.72 For DenguV- 1.08	3.0223
11. Kaempferol	For RSV- 8.214 For AdenoV- 8.21 For	2.8623

	SARCV- 4.60 For Influv- 41.39	
12. Apigenin	For Influv- 1.4 For RSV- 6.328 For SARCV- 75.83 For HCV- .297 For AfricanSV- 57.25	2.7005

(a)	(b)	(c)
13. Luteolin	For SARCV- 5.75 For AfricanSwineV- 286.5 For ZikoV- 15.17	2.8623
14. Catechin	For HSV- 58.05 For AdenoV- 7.67 (from black tea)	2.9026
15. Myricetin	For AdenoV- 12.41 For RSV- 12.41 For SARCV- .8624 For HIV- 2.41	3.1825
16. Genisteine	For AfricanSwineV- 3.513 For HCV- 0.054 For InfluenzaV- 22.05	2.7024
17. Isorhamnetin	For InfluenzaV 15.81 to 31.62	31.1626
18. Anthrocyenin	For SARCV- 9.26	17.305

(a)	(b)	(c)
19. Proanthrocyanidin	For CDV- 53.2 For MayoV- 22.45	5.925
20. Rutin	For CDV- 53.2 For HRV- 1.28 For DenguV- 1.28 For RotaV- 15.83 For ZikoV- 63.49	6.1052

From Table-2 and 3 it is clear that the amount of polyphenols obtained from the proposed diet are good suppliers of IC 50 values and good inhibition values.

So it may be concluded that above polyphenols in the diet concerned are good protectors against the viral diseases mentioned in col.b of Table-3.

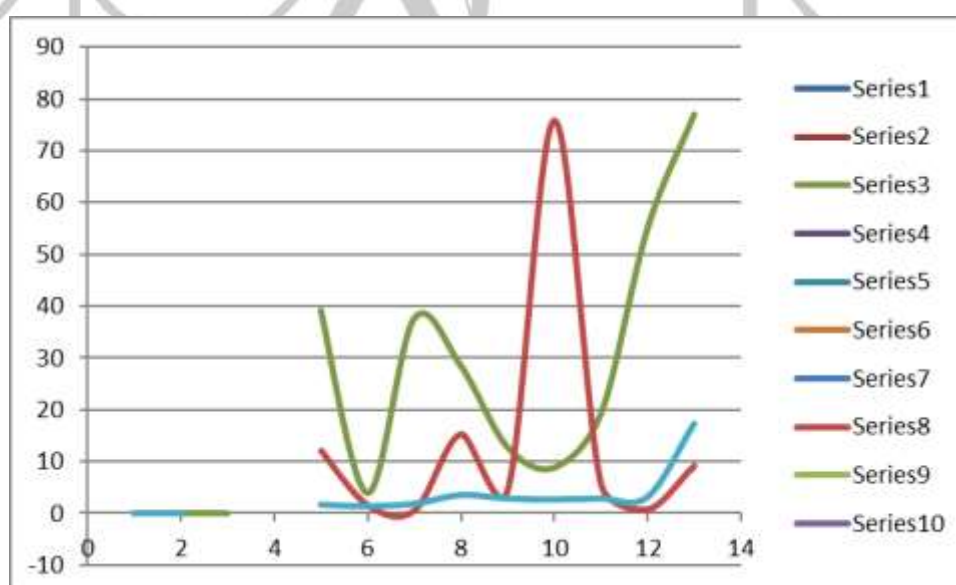
Since the devastating corona virus is now ruling the world to destroy the mankind it may be interesting to see how the IC50 and good inhibitor values are achievable from the polyphenols of the diet. So a graph

has been drawn for the IC50 and good inhibition values (GI) for SARCV and the amount of polyphenols from the proposed diet, the result of which is shown in Table-4.

All the data are for SARCV

Table-4

Polyphenols(a1)	Amount of polyphenol obtainable from the diet per day in mg(b1)	IC 50 values in mg(c1)	Good inhibition (GI) values in mg(d1)
1. Gallic acid	39.11	12.16	1.702
2. Salicylic acid	3.93	1.67	1.3812
3. Caffeic acid	37.15	.6377	1.8616
4. Chlorogenic acid	28.45	15.37	3.5431
5. Kaempferol	12.755	4.60	2.8623
6. Apigenin	8.82	75.83	2.7005
7. Luteolin	19.215	5.75	2.8623
8. Myricetin	55.085	.8624	3.1825
9. Anthocyanin	77	9.26	17.305



In this graph 1) red curve represents polyphenols vs IC 50 values, 2) blue curve represents polyphenols vs GI values and

3) green curve represents polyphenols vs polyphenols obtained from the diet per day. All the variables along y axis are in

mg.

The graph clearly shows that amount of polyphenols obtainable from the proposed diet is always greater than the IC50 values and the good inhibitor (GI) strength, the only exception is for apigenin which shows a sharp rise for IC50 value.

This means that the amount of apigenin obtained from the diet is not sufficient to support a strength for IC50.

However, the good inhibitor strength (GI) is sufficiently below the obtainable amount from the diet concerned. It may be concluded that by adjustable choice of the amount of polyphenols in the diet, it is possible to inhibit the SARCV from attacking the people and protect them from devastating effect. All the other viral attacks tabulated in table-3 can be studied in detail to save the mankind against the severe effect.

Conclusion

Viral attacks are menacing problem of the present day world because so many viral diseases are dominating, the leading one being COVID19.

The disease has taken so many lives, which seems to be an unending process as second wave of the attack is found to be more dangerous and the rate of mortality is increasing vigorously [21]. So scientists and doctors are searching continuously to protect us from the diseases. The medicines for COVID19 are a remote possibility since the nature of the corona virus are changing rapidly.

No body is certain about the CV vaccines.

Under the prevailing circumstances it would be wise to search for protectors and inhibitors against the diseases. Since there are so many polyphenols obtained naturally from food which could give antiviral effect, attention has been drawn to the availability of polyphenols from a proposed diet and their effects on the viral diseases. It has been shown that the proposed diet supplies sufficient amount of polyphenols per day to protect and inhibit against viral diseases. Since the vital problem of the day is COVID19, a detail result of SARCV has been presented which an alternative way to fight against the disease.

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