Hong Kong Student Science Project Competition 2022

Template of Extended Abstract (Investigation)
(Word Limit: 1,000 words, Pages: 2 pages only)

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Project Title: Chinese Traditional Medicines and its uses for the eyes

Project Type: Investigation

To our best knowledge and after thorough literature research, as at 30/6/2022 , there are no* similar works.

I. Background

As the large amount of our population in Hong Kong have eye problems like long-sight, astigmatism, cataract and more due to increasing screen time, our team is trying to find a sustainable, reasonably priced, and natural way to ingest nutrients that are beneficial to our eyes. We decided on traditional Chinese medicine as ingesting these herbs can protect our eyesight without putting extra load on our environment. By obtaining the results, we hope that it can help the population protect their eyes. We have conducted research on all Chinese medicines in this project.

II. Objectives

To find a sustainable, natural way to protect the eyes.

III. Hypothesis

Chinese medicines are efficient in protecting eyesight and may be even better than vegetables and medicines.

IV. Methodology

Special apparatus used: Colorimeter, Cuvette, Ipad for receiving data (App: SPARKvue)
Procedure:

1) Soak each chinese medicine in 50 degrees celsius water, according to a 1:20 ratio, for 30 minutes
2) Next, Grind the mixture into a paste, until all leaves or parts for intake are grinded down thoroughly, using a pestle and mortar. Filter the mixture using a filter funnel and teabag
3) Calibrate the colorimeter
4) Pour the filtrate into a cuvette and put it into the colorimeter for testing. Mark down the absorbance of each extract.
5) Repeat steps 5-6 for 20 times. Recalibrate the colorimeter and try again if suddenly a dramatic result was read.

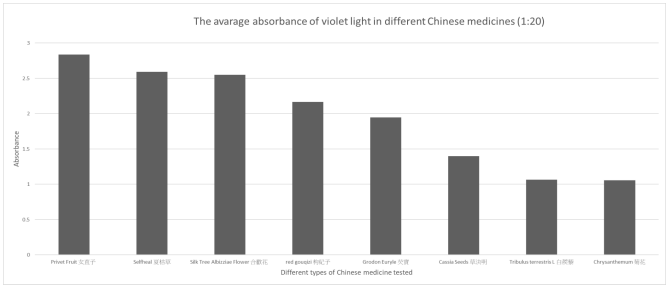
Lutein reduces the amount of blue light that reaches the photoreceptors by selectively absorbing blue or violet light. Blue or violet light does higher amounts of damage to the eye (Age-Related Macular Degeneration) as these light rays have relatively high energy because of their short wavelength.
Now we know the absorbance of Violet light for each Chinese herb. Same method is used to test the absorbances of vegetables and the Ocuvite AREDS 2 eye supplements, with some minor differences. First, the water

concentration in blueberries was too high, affecting the result. We therefore used dried blueberries, but results were similar.

For the eye supplements, lutein and zeaxanthin are insoluble in water, ethanol (C_2H_5OH) waas used as solvent. The absorbance of ethanol is 0.00. Result is not affected.

V. Results

	Vegetables			Herbs									Medicine
	Kale	Spinach	Dried Blueberries	Black goji berry	Red goji berry	Privet Fruit	chrysanthemum	Self- Heal	Gorgon Fruit	Cassia Seeds	Tribulus terrestris	Silk tree albizia flower	Ocuvite Areds 0
Herb : Water scale	1 : 20	1 : 20	1 : 20	1 : 40	1 : 20	1 : 20	1 : 20	1 : 20	1 : 20	1 : 20	1 : 20	1 : 20	1 : 40
Violet absorbance													
Trail 1	1.117	2.854	1.336	1.705	2.124	2.018	1.09	2.586	1.902	1.432	1.101	2.576	2.702
Trail 2	2.519	2.809	1.448	1.704	2.122	2.808	1.068	2.604	1.891	1.382	1.106	2.57	2.581
Trail 3	2.503	2.854	1.323	1.707	2.112	2.927	0.929	2.624	1.866	1.397	1.121	2.535	2.407
Trail 1	2.487	2.831	1.362	1.7	2.107	2.818	1.139	2.574	1.914	1.4	1.103	2.541	2.415
Trail 5	2.519	2.854	1.35	1.694	2.135	2.94	1.081	2.585	1.923	1.415	1.084	2.576	2.541
Trail 6	2.466	2.854	1.357	1.666	2.124	2.799	1.077	2.591	1.924	1.394	1.093	2.558	2.564
Trail 7	2.525	2.798	1.328	1.719	2.176	2.818	1.101	2.579	1.95	1.372	1.067	2.541	2.454
Trail 8	2.508	2.892	1.347	1.696	2.148	2.838	1.104	2.557	1.946	1.398	1.058	2.57	2.392
Trail 9	2.437	2.809	1.32	1.64	2.151	2.966	1.094	2.579	1.91	1.416	0.938	2.535	2.515
Trail 10	2.508	2.854	1.346	1.112	2.184	2.953	1.113	2.585	1.909	1.391	1.065	2.492	2.547
Trail 11	2.492	2.787	1.301	1.686	2.209	2.913	1.065	2.604	1.902	1.383	1.055	2.513	2.553
Trail 12	2.461	2.842	1.286	1.646	2.172	2.972	1.087	2.61	1.999	1.409	0.959	2.487	2.575
Trail 13	2.477	2.809	1.291	1.723	2.176	2.837	1.06	2.587	1.985	1.433	1.053	2.557	2.606
Trail 14	2.514	2.842	1.392	1.721	2.23	2.863	1.07	2.604	2.063	1.414	1.067	2.559	2.515
Trail 15	2.402	2.842	1.382	1.692	2.164	2.875	1.009	2.61	1.92	1.418	1.071	2.514	2.553
Trail 16	2.377	2.809	1.403	1.703	2.162	2.9	1.041	2.575	2.011	1.39	1.069	2.587	2.476
Trail 17	2.389	2.809	1.419	1.676	2.217	2.863	1.047	2.564	1.962	1.382	1.079	2.405	2.581
Trail 18	2.525	2.867	1.401	1.669	2.194	2.913	0.999	2.597	1.995	1.385	1.063	2.625	2.553
Trail 19	2.531	2.842	1.396	1.666	2.199	2.852	0.981	2.61	1.976	1.402	1.107	2.599	2.377
Trail 20	2.18	2.842	1.395	1.704	2.217	2.9	0.99	2.593	1.996	1.37	1.084	2.682	2.399
Average	2.39685	2.835	1.35915	1.66145	2.16615	2.83865	1.05725	2.5909	1.9472	1.39915	1.06715	2.5511	2.5153



We can see that Chinese medicine delivers satisfactory results. The medicine which has the highest absorbance (violet light) is the Privet fruit.

The absorbances of Privet fruit, silk tree Albizia flower and the Self Heal plant are close to the supplement's absorbance of violet light.

We can see the uses of traditional Chinese medicines from the above data. Therefore we believe that Chinese medicine can act as a natural, sustainable way to protect the eyes and protect the eyes of our population.

VI. Conclusion

By comparing the absorbances of vegetables and the supplement to Chinese medicine, we can see that Chinese medicines' results aren't too far from the vegetables and the supplement. The uses of traditional Chinese medicines to the eyes can be noted and therefore we believe that Chinese medicine can act as a natural, sustainable way to protect the eyes.

VII. Our project is developed based on our school's previous project and the enhancement is as below:

Our school's previous project is more focused on fruits and vegetables that benefit the eyes. This time we focus on Chinese medicines and how it benefits the eyes.