



## Invention of Homemade Vitamin C tablet

<sup>1</sup>Dr.Tirth Thaker,<sup>2</sup>Bharat Hadiyal,<sup>3</sup>Apurva Shah,<sup>4</sup>Janak Tadha, <sup>5</sup>Ashfiya Shaikh

<sup>1</sup>Assistant Professor, Parul Institute of Applied Science, Parul University, Waghodia-391760, Vadodara, Gujarat, India

<sup>2</sup>Student, Parul Institute of Applied Science, Parul University, Waghodia-391760, Vadodara, Gujarat, India

<sup>3</sup>Student, Parul Institute of Applied Science, Parul University, Waghodia-391760, Vadodara, Gujarat, India

<sup>4</sup>Student, Parul Institute of Applied Science, Parul University, Waghodia-391760, Vadodara, Gujarat, India

<sup>5</sup>Student, Parul Institute of Applied Science, Parul University, Waghodia-391760, Vadodara, Gujarat, India

**Abstract:** The main purpose of our research work is to study the various properties of vitamin C with various parameters on the formations of tablets containing home-made products will be studied in our search work. The tablets made of vitamin C will be elevated in this research work.

**Key Words:** Amla, Orange, Lemon, Modified Starch.

**Introduction:** The immune system is a complex system of specialised organs, tissues, cells, proteins, and chemicals that evolved to protect the host from a variety of pathogens, including bacteria, viruses, fungi, and parasites, as well as cancer cells<sup>1</sup>. It is made up of epithelial barriers, cellular and humoral components of innate (non-specific) and acquired (specific) immunity<sup>1</sup>. These components interact in a variety of sophisticated ways. Vitamin C has been found to be important in numerous areas of the immune system, notably immune cell activity, for more than half a century of research<sup>2,3</sup>.

Vitamin C is a necessary substance that humans are unable to produce because to the lack of a critical enzyme in the biosynthesis pathway<sup>4,5</sup>. Scurvy is a potentially lethal condition caused by a severe vitamin C deficiency.<sup>6</sup>

Vitamin C is a necessary substance that humans cannot produce due to the absence of a critical enzyme in the biosynthesis pathway<sup>4,5</sup>. Vitamin C has a number of actions that may help explain why it has immune-modulating characteristics. It is a highly effective antioxidant, protecting important biomolecules from damage caused by oxidants produced during normal cell metabolism and by exposure to toxins and pollutants due to its ability to readily donate electrons.<sup>7</sup> Vitamin C also functions as a cofactor for a series of monooxygenase and dioxygenase enzymes involved in biosynthesis and gene regulation.<sup>8,9</sup>

Amla fruit containing high levels of vitamin C, tannins, polyphenols, fibers, minerals, proteins, and amino acids. In both animal and human investigations, scientists have shown that amla possesses hypoglycemic, anti-inflammatory, anti-hyperglycemic, anti-hyperlipidemic, and antioxidant characteristics.<sup>10-11</sup> Orange is excellent sources of potassium, ascorbic acid, folate, polyphenols and flavonoids such as naringin, hesperidin, neohesperidin, citronin, narirutin and polymethoxylated flavones such as tangeritin, nobilitin, sinensetin.<sup>12</sup> Lemon is an excellent source of vitamin C. limonene is the primary element . Leaf oil was recognized with  $\beta$ -

pine, myrcene, neral, geranial, neryl acetate, geranyl and  $\beta$ -caryophyllene. Peel oil had  $\mu$ -terpinene,  $\beta$ -pinene, myrcene.<sup>13</sup> Modified Starch is used as a binder. When compared to pure starch-based binder, it has an appropriate viscosity and high affinity binding.

Vitamin C is most inevitable essential dietary factor for human. Thus, looking towards high nutrient values of amla, lemon & oranges, we decided to formulate Vitamin C tablets & evaluated its potency by comparing it with Standard Vitamin C tablet.

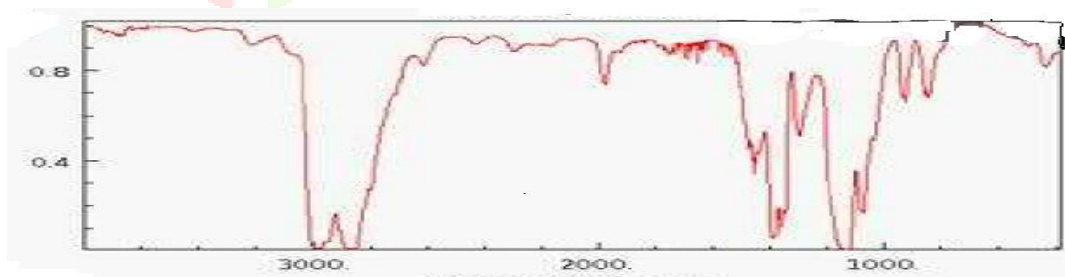
**Materials & Methods:** The processes technique of the tablet base form on vitamin C. Several ways and means are applied in tablets. Our main concept is to make vitamin C tablets by any means of homemade method, that tablets can be made of on stationary and home-made materials. Thus, the experiments we have done are as follow. First take 300gm Amla and cut into small pieces. Dry these Amla in Sunlight for 5 Days grind these dried amla in mixture and sewed. Take 250gm fresh oranges and take out juice of from these fresh oranges. Take 200gm fresh lemon and take out juice of from this fresh lemon.

**Preparation of Tablets:** Take 50gm dried amla powder prepared from 250gm amla fruits Add 20mL lemon juice and 40mL orange juice in this dried amla powder and mixed well. In this mixture add 1 gm modified starch powder used as a binder mixed well. Mixture kept in tablet machine by adjusting 150 barr pressure for 5 mins and prepared a tablet.

**Results & Discussion:** Prepared Vitamin C tablet subjected to IR analyses & HPLC analyses for detection of possible functional groups present and potency comparison with standard tablet of Vitamin C.

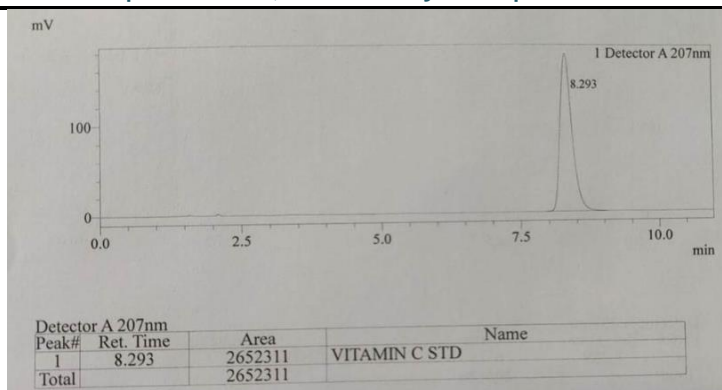
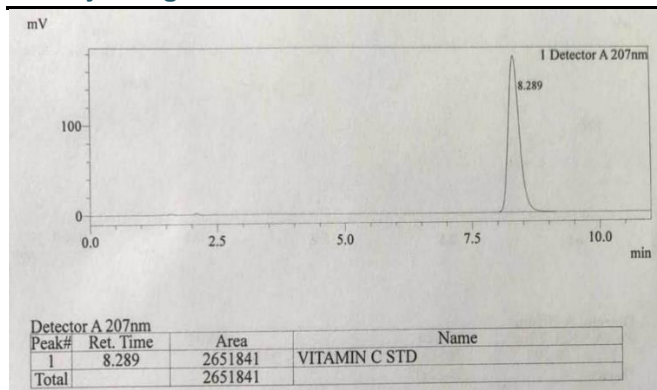
**FT-IR Analyses:** IR Spectroscopy is a technique for detecting light absorption by a substance in the infrared region of the electromagnetic spectrum. A molecule must have a bond within its structure that can exhibit a dipole moment, which means electrons within a bond are not shared equally, in order to absorb light.

**Graphical interpretation:** IR spectra of prepared *Vitamin C tablet* showed frequencies ( $\text{cm}^{-1}$ ) at 3500-2800(b), 2915.89, 1745.4, 1668.54, 1457.95, 1320.11, 1211.38, 1195.83, 1118.80, 1025.88, 988.45, 756.26, 683.27, 636.63 indicating hydroxyl, methylene, alkenes, ether groups of Vitamin C. Fig 1 represent IR analysis data graph of prepared Vitamin C *tablet*.

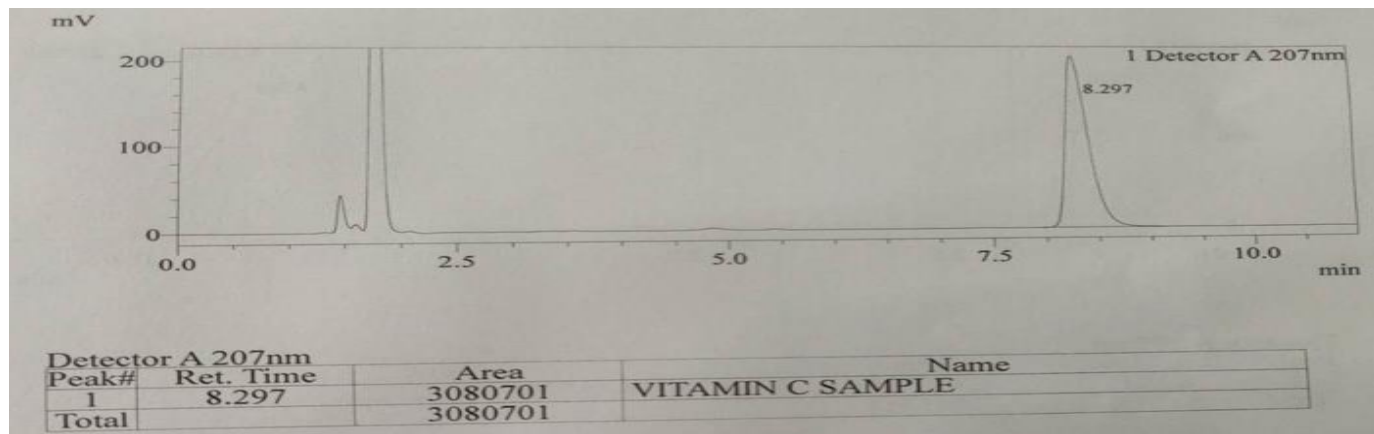


**Fig 1: IR spectrum of Prepared Vitamin C tablet**

**HPLC Analyses:** Prepared Vitamin C tablet subjected to HPLC analyses at 207 nm for its confirmation and detection of potency compare to standard. Two standard tablets were injected to HPLC & seen its purity. Following same method, prepared Vitamin C tablet also injected and seen HPLC purity.



**Fig. 2 Different manufactured Vitamin C Standard sample HPLC analysis**



**Fig. 3 Prepared Vitamin C tablet HPLC analysis**

**TABLE 1: COMPARISON OF HPLC PURITY, RETENTION TIME OF PREPARED VITAMIN C WITH VARIOUS SAMPLES**

Sr.No.	STANDARD	AREA	RETENTION TIME (RT)
1	STANDARD 1	2651841	8.289
2	STANDARD 2	2652311	8.293
3	PREPARED VITAMIN C	3080701	8.297

So, from above HPLC analyses prepared Vitamin C tablet's retention time is matches with standard and potency is also 95%, so successful formulation of Vitamin C tablet confirmed.

Costing: For our homemade Vitamin C Tablets, 300gm amla powder, 200gm Lemon, 250gm Orange and 1gm modified starch powder and make mixture of all Ingredients and make tablets. 83 tablets of weight approx. 550 mg and costing of these 83 tablets is 90 rs so, per tablet rate is 1.08rs. Compared our with Vitamin C tablet with other Vitamin C tablets which are available in the markets, so found that our prepared tablet is less costlier than the market price.

**Table 2: Comparison of inhouse Vitamin C tablet costs with market manufacturers**

Sr.no	Name of Product	Name of Manufacturer	Claims	Tablet per strips/ Rate	Rate per Tablet
1	Vitamin C Tablets	Jackson Labotries pvt.ltd.	500mg	10 Tablets/ 38.59rs	3.85rs
2	Limcee Tablets (Vit.C)	Abbot Healthcare pvt.ltd.	500mg	15 Tablets/ 18.90rs	1.26rs
3	Vitamin C Tablets	Koye Pharmaceuticals pvt.ltd.	500mg	25 Tablets/ 31.68rs	1.26rs
4	<b>Homemade Vitamin C Tablet</b>	<b>Our Synthesized product</b>	<b>550 mg</b>	<b>83 Tablets/90rs</b>	<b>1.08rs</b>

**Conclusion:** Synthesized homemade Vitamin C Tablets analysed by IR and HPLC techniques. We found 95 percent vitamin C potency by HPLC techniques. The cost of our home-made Vitamin C tablet is low relative to other Vitamin C tablets available in the market. So, it has been great scope for commercialization.

**Acknowledgement:** The authors are thankful to the president Dr. Devanshu Patel of Parul university for providing necessary infrastructure.

#### References:

1. Parkin J., Cohen B., 2001, An overview of the immune system. *Lancet.*, 357:1777–1789.
2. Maggini S., Wintergerst E.S., Beveridge S., Hornig D.H., 2007, Selected vitamins and trace elements support immune function by strengthening epithelial barriers and cellular and humoral immune responses. *Br. J. Nutr.* 98, 29–35.
3. Webb A.L., Villamor E., 2007, Update: Effects of antioxidant and non-antioxidant vitamin supplementation on immune function. *Nutr. Rev.*, 65, 181.
4. Burns J.J., 1957, Missing step in man, monkey and guinea pig required for the biosynthesis of L-ascorbic acid. *Nature.*, 180:553.
5. Nishikimi M., Fukuyama R., Minoshima S., Shimizu N., Yagi K., 1994, Cloning and chromosomal mapping of the human nonfunctional gene for L-gulonono-gamma-lactone oxidase, the enzyme for L-ascorbic acid biosynthesis missing in man., *J. Biol. Chem.*, 269, 13685–13688.
6. Sauberlich, H.E., 1997, A history of scurvy and vitamin C. In *Vitamin C in Health and Disease*; Packer, L., Fuchs, J., Eds.; Marcel Dekker: New York, NY, USA, 1–24.
7. Carr, A.; Frei, B. 1999, Does vitamin C act as a pro-oxidant under physiological conditions? *FASEB J.*, 13, 1007–1024.
8. Mandl, J.; Szarka, A.; Banhegyi, G., 2009, Vitamin C: Update on physiology and pharmacology. *Br. J. Pharmacol.* 157, 1097–1110.
9. Englund, S.; Seifter, 1986, S. The biochemical functions of ascorbic acid. *Annu. Rev. Nutr.* 6, 365–406.

10. Dasaroju S., Gottumukkala K.M., 2014, Current trends in the research of *Emblica officinalis* (Amla): a pharmacological perspective. *Int. J. Pharm. Sci. Rev. Res.*;24(2):150–159.
11. Zhang Y.J., Abe T., Tanaka T., Yang C.R., Kouno I., 2001, Phyllanemblinins A– F, new ellagitannins from *Phyllanthus emblica*. *J. Nat. Prod.*;64(12):1527–1532.
12. Bai J, Manthey JA, Ford BL, Luzio G, Cameron RG, Narciso J and Baldwin EA. 2013, Effect of extraction, pasteurization and cold storage on flavonoids and other secondary metabolites in fresh orange juice. *Journal of the Science of Food and Agriculture*, 93: 2771-2781.
13. S.A. Vekiari, E.E. Protopapadakis, P. Papadopoulou, D. Papanicolaou, C. Panou, M. Vamvakias. (2002). Composition and seasonal variation of the essential oil from leaves and peel of a Cretan lemon variety. *Journal of agriculture*, 15, 2786-2881.

