

**Research Article****SWINE FLU- THE CHANGING SCENARIO AND PREPAREDNESS WITH FORMULATION OF "WIN FLU AIR FRESHENER GEL"****Ayush Kumar Garg^{1*}, Amit Singh¹, Harish Vishnoi¹, Gulab Chand Meena¹, Chandan Singh², Manoj Adlakha³**¹PG Scholar, ²Associate Professor, ³Assistant Professor, PG Department of Dravyaguna, Dr.Sarvapalli Radhakrishanan Raj. Ayurved University, Jodhpur, Rajasthan, India.**ABSTRACT**

Swine flu is an emerging viral infection that is a present global public health problem. There are many thousand cases of swine flu can be seen around the world in the present day. Due to the nature of a respiratory virus, the transmission of this pathogenic virus is airborne transmission. Hence, the rapid spreading and difficulty in control of this infection can be expected. Ayurved believes in *Nidan parivarjan* and recommends the strengthening of the immunity to prevent disease like swine flu from its attack. There are no any medicines or vaccination are available now a days for prevent from swine flu. Mask is an only available option from avoiding the virus, but sometimes it fails to stop the infection and peoples are unable to wearing mask for all time. So there is a need to develop such a thing which we can carry easily with us and protecting from the infection. Many environment purification techniques (like *Homa, Yagya, Dhoopana*) have been mentioned in our classical texts.

Several scientific studies have validated the clinical efficacy of air freshener against the viral stains. Freshener is a household product that can release the chemicals they contain into the air and inhaled by consumers. The purpose of this research is to determine the ability of herbal essential oil to be formulated as a "WIN FLU- air freshener gel" with fragrance of citrus oil and binder of peppermint oil. Gel formulation in the study was made from a mixture of herbal essential oil (carom seed, Eucalyptus, Basil, Ginger, Clove), sodium benzoate, peppermint and citrus essential oil in distilled water with a variety of different concentrations of herbal essential oil at 1%, 2% and 3%, then performed an evaluation form hedonic test gel with 30 panelists, evaporation of a liquid test during 4 weeks of storage. The results of this study indicate that the best gel formula is the formula A3 with an herbal essential oil concentration of 3%. Results per cent of total evaporation of liquid air freshener gel formula are respectively 59.12%, 42.32%, 21.22%.

KEYWORDS: *Nidan parivarjan*, Herbal essential oil, *Dhoopana*.

INTRODUCTION

H1N1 influenza, also known as "novel H1N1 virus" has led to a "global outcry." Swine flu is an emerging viral infection that is a present global public health problem. There are many thousand cases of swine flu in the present day. This new infection can be seen around the world in the present day. This infection is a kind of variant of H1N1 influenza infection (Figure 1). The problematic virus was firstly detected in America in 2009 and this virus is the most widely studied viruses in the present day. Due to the nature of a respiratory virus, the transmission of this pathogenic virus is airborne transmission. Hence, the rapid spreading and difficulty in control of this infection can be expected [1].

Swine flu, also called pig influenza, swine influenza, hog flu and pig flu. Swine influenza virus (SIV) or S-OIV (swine-origin influenza virus) is any strain of the influenza family of viruses that is endemic in pigs [2]. As of 2009, the known SIV strains include

influenza C and the subtypes of influenza- A known as H1N1, H1N2, H3N1, H3N2, and H2N3. Swine flu viruses have been reported to spread from person-to-person, but in the past, this transmission was limited and not sustained beyond three people. In March/April 2009 human cases of influenza swine fevers (H1N1) were first reported in California and Texas then later in other states and even in Mexico. In 2009 the media labeled as "swine flu" the flu caused by 2009's new strain of swine-origin A/ H1N1 pandemic virus just as it had earlier dubbed as "avian flu" flu caused by the recent Asian-lineage HPAI (High Pathogenic Avian Influenza) H5N1 strain that is still endemic in many wild bird species in several countries [3].

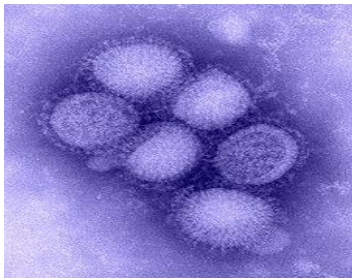


Fig. 1 Electron microscope image of the reassorted H1N1 influenza virus. The viruses are ~100 nanometers in diameter. [4]

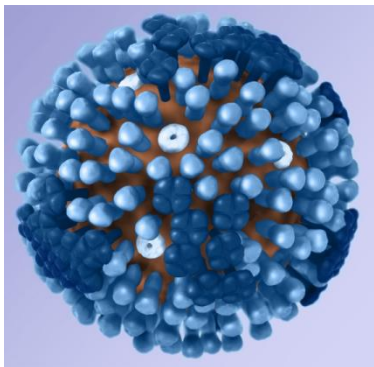


Fig 2 Graphical representation of a generic influenza virus. Credit: CDC

Antigenic variation

This virus is more virulent when compared with other seasonal flu viruses. Virulence may change as the adaptive mutation gene increases within the virus.

Influenza viruses have long been known for their ability to change, creating new strains of virus that infect naive populations. Influenza viruses change by two processes, antigenic drift and antigenic shift.

Antigenic drift^[5] is the process by which influenza viruses continually change their antigenic characteristics. This is an important process driven by the immune response to influenza viruses. Antibody targeted against the viral antigens binds and neutralize the virus-containing antigen. The influenza viral DNA polymerase is prone to mistakes and new genes are often produced, resulting in the production of new antigen. The accumulation of these changes over time leads to mutations, which produce hemagglutinin and neuraminidase that are not targeted by antibody. As a result, new serotypes of the viruses are produced. Antigenic drift causes past immunity against influenza to become incapable of fighting the disease caused by mutated viral strains.

Table.1 Influenza A (H1N1) - Year- wise number of cases and death from 2010 to 2017 (till 3rd September 2017)

Year	2010		2011		2012		2013		2014		2015		2016		2017	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
Cumulative Total	20604	1763	603	75	5044	405	5253	699	937	218	42592	2990	1786	265	29076	1415

(Abbreviations: C- Cases, D- Deaths)

Source of Data- Ministry of Health and Family Welfare, India.

Antigenic shift^[6] is the formation of a new strain of viruses by the combination of at least two different strains. When a cell is simultaneously infected by two different strains of influenza virus, the genes of each strain become mixed during replication. As a result, when the viral components recombine, some of the genetic material from one strain of virus ends up in the other, producing a new strain with new genetic material. It is quite clear that the swine acts as a "mixing vessel" for human and avian influenzas. Hemagglutinin binds with sialic acid on the receptor, allowing the virus to enter the cell. Hemagglutinin on avian influenza has shown to bind different types of sialic acid than human influenza hemagglutinin. Swine have both these types of sialic acid in their respiratory tracks. As a result, swine can be infected with either human or avian influenza, facilitating antigenic shift^[7] and hence the influenza virus is also called swine flu virus.

The Indian Scenario

The country has so far recorded 29076 cases, with Maharashtra leading with maximum 504 Death, followed by Gujarat with 367 and Rajasthan with 100 deaths. However, in 2016 the swine-related cases were 1,786 and deaths were 265. Till now, 2015 was the year which saw the worst outbreak of swine flu, with a total of 42,592 cases and deaths recorded at 2,990 highest in the last one decade. In 2017, no cases of swine flu have so far been reported from three northeastern states of Mizoram, Nagaland and Meghalaya.

India has truly no access to medical care or molecular diagnostic modalities necessary for confirmation. The maximum number of cases has been reported among young adults, with the very young and elderly being relatively spared. Males were affected more than the females. The peak was witnessed during the months of September to December 2009 followed by decline.

Elsewhere regional transmission continues at a low level and the forthcoming influenza season during winters in the northern India is being keenly watched. The average positivity has been 23% but during the peaks in Sept-Dec, it was close to 50%. H1N1 novel has been the most prevalent strain (70%) followed by seasonal H1N1 and influenza B. The viral shedding stopped in 80% by day 7 and in 99% by day 10 (NCDC- National centre for disease control).

Table 2. Top 10 H1N1 affecting states where max. cases and Death are recorded in 2017 (till 3rd September 2017)

S.N.	States	No. of Cases	No. of Death
1.	Gujarat	5557	367
2.	Maharashtra	4709	504
3.	Tamil	3073	15
4.	Karnataka	3060	15
5.	Uttar Pradesh	2957	67
6.	Delhi	2428	6
7.	Telangana	1691	17
8.	Kerala	1384	75
9.	Rajasthan	1223	100
10.	West Bengal	666	20

Future Scenario

The world anxiously watches the story of influenza unfold. Although novel H1N1 remains the most prevalent strain, seasonal H1N1, H3N2 and influenza B are also currently circulating in India. Whether they will be completely replaced by novel H1N1 is a difficult guess. The risk of H1N1 drifts leading on to a more virulent strain, or re assortment with H3 leading to a novel virus are other uncertain threats. The WHO expects predominantly H1N1 2009 with H3N2 and influenza B to circulate, hence the recommendation of this trivalent combination for 2010-11 season. The worst may not be over yet, thus the Department of Health; Govt of India cannot be complacent. Indeed, this is the ideal time to strengthen the health infrastructure with regard to establishment, co-ordination, implementation, and continued surveillance not only for influenza but for other preventable diseases too.

Ayurved Perspective of Swine Flu

Symptoms of swine flu can be called as *Sannipataja jwar*, which is triggered by aggravation of *Vata, Pitta & Kapha doshas* and loss of *Ojas* (immunity) in the body. Low *Ojas* is lack of immunity of body and absence of mental strength at mental level. Hence Ayurved recommends the strengthening of the *Ojas* (immunity) to prevent disease like swine flu from its attack.

Swine flu symptoms are similar to those of seasonal flu, which include fever, cough, fatigue, body ache, sore throat, headache and chills. Sometimes they may be accompanied with vomiting and diarrhea.

It mostly occurred in the period of *Ritu sandhi*, means we can experience both hot and cold condition during this *Ritu sandhi* the bal immunity of our body also coming down due to weather condition and it can aggravate the *Vata* and cough and causing *Vata-shleshmik jwar*.

Medicine in Ayurveda^[8]

Ayurveda promotes the concept that if one's immune system is strong, then even if the body is exposed to viruses, one will not be affected. Though Ayurveda is ancient in its origin, but its concepts like

Janapadodwansa (devastating epidemics) are still holds current importance.

During a pandemic or an epidemic, Ayurveda emphasizes on the immunity of people living in regions affected by viruses. This branch of medicine promotes the intake of special herbs or decoctions to increase the immunity level of the people. Ayurvedic remedies comprise pure natural herbs which are effective in preventing swine flu. Moreover, the herbs are used to relieve swine flu symptoms, and boost the immune system against the H1N1 virus.

Ayurveda believes in striking a balance between an individual (body, mind, soul, spirit) and environment. Measures like water purification, *Homa, Yagna, Dhoopana* have been mentioned in our Ayurvedic texts.^[9] *Dhoopana* is a method by which drugs of herbal, herbomineral or animal origin are used for fumigation.

Since *Vedic* period sterilization of house & environment around it by *Dhoopana*, has been going on traditionally. *Dhoopana* has been mentioned in *Atharva Veda*. *Dhoopana* has also been mentioned for its antimicrobial and growth promoting activities for the healthy production of plants in *Vrikshayurveda*. *Dhoopana* is an integral part of *Rakshavidhi*, which ensures protection against microbes. *Dhoopana* has broad spectrum of aesthetic, psychological and medical significance.

It is the science of maintaining the integrity and vitality of all the bodily tissues as well as the mind. These therapies develop positive health, improve mental faculties, increase stamina, and promote immunity against disease. The effectiveness of this approach in preserving and restoring metabolic and physiologic health is supported by the simple yet eloquent and direct statement of Charaka more than three millennia ago.

Formulation of "win flu-an air freshener gel"

Freshener consists of two basic ingredients, namely, fragrances and solvents. Solvents there are two types of water and oil. Fragrances that use water-based materials are made in the form of a gel.

Materials and Methods

This study is experimental that illustrate the characteristics of the air freshener gel with varying concentrations of the essential oils as gelling agent with citrus oil as fragrance and peppermint oil as binders. The materials used in this research are: herbal essential oil, Ethanol, Distilled Water, Propylene Glycol, Sodium Benzoate, peppermint oil and citrus oil.

Formulation of Herbal essential oils

In the formulation of herbal essential oils, essential oil production is accomplished by extraction through Water and steam distillation technique.

Essential oil are extracted from -

Trachyspermum ammi (Ajwain)- Seed -10 gm

Eucalyptus globules (Eucalyptus) - Leaves-20 gm

Ocimum sanctum (Basil) - Leaves- 20 gm

Zingiber officinalis (Ginger) - Rhizome-10 gm

Syzygium aromaticum (Clove) -Buds- 20 gm

Raw materials are washed until they are absolutely clean. Water is poured and raw materials are put into the distillation device. Then lid is closed. A condenser is placed on the top of the devices. When the water in the device boils, they gather the essential oil from the raw material. The steam goes up and entered the condenser through an opening in the lid. The essential oil dripped through the condenser to a glass pipe filled with water. After 20 min heat is turned off and the water from the glass pipe is drained. The oil is gathered into a bottle. After 24 hour all residue sink into the bottom. The pure oil is then diluted and bottled. The process can be seen in fig. 3 and 4.



Fig 3:-Process of extraction of essential oil through Water and steam distillation technique

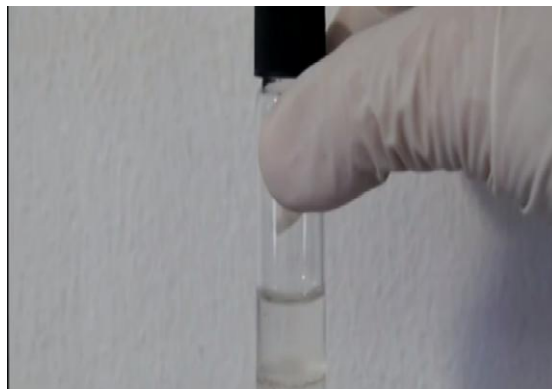


Fig 4:- Vial containing essential oil

Win Flu-Air Freshener Gel Composition

Table3: Several formula of freshener gel formulation with variation of essential oils concentration

S.N.	Materials	A1 (g)	A2 (g)	A3 (g)
1	Citrus Oil 2%	2.00	2.00	2.00
2	Peppermint Oil 2 %	2.00	2.00	2.00
3	Herbal essential oil	1.00	2.00	3.00
4	Sodium Benzoate 0,1%	0.10	0.10	0.10
5	Propylene Glycol 10%	10.00	10.00	10.00
6	Distilled water	84.90	83.90	82.90
	Total	100	100	100

Note: A1: Gel with 1% concentration of herbal essential oil 1%; A2: Gel with 2% concentration of herbal essential oil; A3: Gel with 3% concentration of herbal essential oil.

Air Freshener Gel Formulation

Distilled water was added to sodium benzoate and stir. Heated at a temperature of 75°C and then lowered the temperature to 65°C. Gelatin and propylene glycol is added and stir until dissolved, remove the mixture from heat then added peppermint oil, herbal essential oil and citrus oil, stirring until homogeneous, inserted in the mold and allowed to stand at room temperature [10]. Sample of air freshener gel can be seen in Fig 5.



Fig:-5 Sample of “WIN FLU Air freshener gal”

Hedonic Test

Hedonic test is the test method used to measure the level of preference for products using the assessment form. A minimal amount of panelists in one test is 6 people. According to the National Bureau of Standards (2006) terms panelists were as follows:

- Attracted by the organic test sensory and willing to participate
- Consistent in taking decisions
- Healthy body

A test was conducted to determine the level of panelist preference to air freshener gel preparation that has been made. Testing was performed using 30 panelists by asking each panelist to smell air freshener gels and calculated the percentage of preference for each dosage. It can be concluded that a good formula. The assessment criteria of air freshener gel preparation are shown in Table 4.

Table 4. Assessment criteria of air freshener gel preparation

S.N.	Criteria	Score
1	Very Fragrant	5
2	Fragrant	4
3	Moderate Fragrant	3
4	Less Fragrant	2
5	Not Fragrant	1

Total Liquid Evaporation

Liquid evaporation test of Air freshener gel preparation is done by weighting the gel weight each week for four weeks. From this test, obtained gel weight

loss for every week and a total weight reduction after four weeks of storage. Weight reduction of air freshener gels obtained by calculating the difference in weight of the gel in the previous week (M_{n-1}) with a weight of gel at the time of weighing (M_n), while the total weight loss is (M_4) with weight of gel at the initial time (M_0). The difference in weight is the amount of liquid that evaporates. Percent of total liquid evaporation and percent of residual gel weight was measured by gravimetry and calculated by the formula:

- Total liquid evaporation Percentage: $-(M_n - (M_{n-1}) / M_0 = 100\%$
- Residue Gel weight percentage: $-M_n / M_0 = 100\%$

RESULTS

In this study, essential oils acts as the main ingredient in the manufacture of gel, distilled water as solvent, propylene glycol as emulsifier, sodium benzoate as a preservative, citrus oil as a fragrance, and peppermint oil as a fixative (binder).

Hedonic Test

A test was conducted to determine the air freshener gel formula that is preferred by the panelists, the test of the 30 panelists were asked to smell the scent of air freshener gels and subsequently asked to fill out the assessment form (questionnaire) that has been provided. The data obtained from the assessment sheet determined the preference value for each preparation by finding the average yield of all the panelists at the 95% confidence level. Overall results of hedonic test at various time intervals and various formulas can be seen in Table 5.

Table 5. Results of hedonic test at various time intervals and various formulas

S.N.	Time	Hedonic Test Results		
		A1 Formula	A2 Formula	A3 Formula
1	1 st Week	Moderate Fragrant	Fragrant	Very Fragrant
2	2 nd Week	Less Fragrant	Moderate Fragrant	Fragrant
3	3 rd Week	No Fragrant	Less Fragrant	Moderate Fragrant
4	4 th Week	No Fragrant	No Fragrant	Less Fragrant

Note: A1: Gel with 1% concentration of essential oils 1%; A2: Gel with 2% concentration of essential oils; A3: Gel with 3% concentration of essential oils;

Hedonic test results data showed that scented of gel air freshener is the most preferred formula A3 with 3% concentration of essential oils. Formula with a low concentration of essential oils is less preferred. The higher the concentration of essential oils then the ability to maintain scented gel formulation to better and more favored. This happens because the smell will be stored by essential oils, which has been expanding into a gel and released slowly so that it can last longer [11-12].

Percent of Total Liquid Evaporation and Percent of Residual Gel Weight

Total liquid evaporation determined by weighting gel air freshener and calculates weightings for four weeks. Preparations weight was missing an essential oil and water evaporation of gel. Therefore, the major weight loss is inversely with the endurance of the gel [13-14]. The smaller the weight lost or the greater weight of the remaining mean less volatile oil and water to evaporate, the greater the resistance scented gel [15-16].

Gel formula has a same initial weight, then for updates every week, calculating the weight loss gel gravimetrically, by calculating the value of the remaining weight percentage of the initial weight of the product. Freshener gel product that has value to the remaining weight percentage of initial weight is higher evaporation means having a smaller, in other words have a higher resistance fragrance. The percentage of residual gel weight of the gel air freshener for 4 weeks is shown in Table 6.

Table 6. Percentage of residual gel weight of the gel air freshener

Number	Time	Residual Gel Weight (%)		
		A1 Formula	A2 Formula	A3 Formula
1	1 st week	85.34	90.44	95.53
2	2 nd week	75.15	80.33	85.28
3	3 rd week	64.02	70.11	79.55
4	4 th week	41.55	59.54	72.45

Note: A1: Gel with 1% concentration of essential oils 1%; A2: Gel with 2% concentration of essential oils; A3: Gel with 3% concentration of essential oils

Residual gel weight percentage of formula A3 with 3% concentration of essential oils was the highest, means the ability of formula A3 in maintaining the evaporates substance in a formula better than the formula A1 and A2. This is in line with research that states that essential oils is a gelling agent that is able to maintain the content of the gel preparation^[17-18]. Percentage of total liquid evaporation of air freshener gel for four weeks can be seen in Table 7.

Table 7. Total liquid evaporation of air freshener gel for four weeks

S.N.	Formula	Total Liquid Evaporation (%)
1	A1	59.12
2	A2	42.32
3	A3	21.22

Note: A1: Gel with 1% concentration of essential oils 1%; A2: Gel with 2% concentration of essential oils; A3: Gel with 3% concentration of essential oils

The total shrinkage lowest to the highest weight in sequence is the formula A1 is 59.12 %, i.e. 42.32 % formula A2, A3 formula that is 21.22 %. Formula A1 contains little essential oils so that evaporation is higher than the melting substances A2 and A3 formulas that contain more essential oils and the more a formula containing essential oils then the slow evaporation of the liquid. Formula A1 is less preferred by the panelists while A2 and A3 preferred by the panelists as more contains essential oils. From the test results organoleptic test by 30 panelists can be seen that the formula A3 is the most preferred by the panelists and still meet the requirements, namely at a temperature of 35° C can last up to 4 weeks^[19-20].

DISCUSSION

Essential oils can be formulated as a base in the preparation of air freshener with fragrance of citrus oil. The concentration of essential oils as an air freshener last a long time is a concentration of 3%.

Essential oils from many plant families have demonstrated antiviral properties in the laboratory. Many of the abstracts on Pub MED, the database of the National Institute of Health for peer-reviewed journal articles, describe essential oils activity as an excellent preventative measure. Use before exposure can lessen the potential of infection. This is the case for any type of virus, be it our 'regular' flu season or to the current potential pandemic threat of H1N1 swine flu.

Essential Oils and Influenza Viruses

Essential oils stimulate the immune system and can drastically alter our immune defenses to protect against the Influenza virus. The pH and electrical resistance in the 'host' (infected) cells and tissues can be altered in such a way as to be unfavorable to virus replication. Further, research has shown that many of

these oils raise chemical markers in the body, which indicate positive stimulation of the immune system.

With the news of potential pandemic influenza prevailing the airwaves, many health professionals are turning to Ayurvedic medicines to support their immune system. There's great interest in protecting one's self and one's family from Swine Flu, Avian Flu and the like. Although there has not been any large-scale trials on influenza-prevention using natural methods.

Essential oils may provide a protective effect

Increasing the strength and efficiency of our immune response

The human body can fight a disease only when its immunity is strong and this herbal gel comes to the rescue when we feel our resistance is waning away.

Detoxification of lymphatic system

It provides the way out by detoxification and cleansing of the lymphatic system, thereby reducing the chances of the virus attack. This can also help in doing away with congestion in the lymphatic system, thus leaving us free from virus.

Stay away from germs

Staying germ free and clean is the best way to keep infection at bay and in this method some oils that are known for their anti-septic qualities.

Preventing the spread of the H1N1 virus is the best defense against it. Boosting the immune system to enable the body to fight and resist the virus is also important. Both strategies may be effectively achieved with the use of the appropriate essential oils. For respiratory infections and Influenza, these herbs (Ajwain, Eucalyptus, Basil, Ginger, Clove) have been used with success, and can be safely used as an adjunct to regular medical care.

CONCLUSION

How much better would our future be with more light, depend on access to new innovation. It can bring opportunity in health care. As noted earlier, the world's leading medicine practitioners believe the most important healing potential for essential oils is in the prevention and treatment of infectious illness. Of course, one should evaluate every available means of strengthening their immune system and those of their loved ones, there are many ways health professionals will recommend to do this. It can be concluded that "WIN Flu herbal air freshener gel" can be used as an effective herbal air freshener in controlling the transmission of disease and can have potential implications in controlling measures against the spread of associated diseases.

ACKNOWLEDGEMENT

The first author would like to thank to the Dr. Radheshyam Sharma (honorable V.C. sir, DSRRAU), Dr. Chandan Singh (HOD & Associate. Professor, PG department of Dravya guna vigyan), Dr. Manoj Adlakha (Assistant Professor) for providing multifarious facilities. Thanks are also expressed to the research colleagues and technicians who cooperated in carrying on the standardization methods and helped in collecting the information about the herbs.

REFERENCES

1. Wiwanitkit V. Swine Flu: The Present Pandemic Infectious Disease. Kulak Burun Bogaz Ihtis Derg., 2009; 19(2):57-61.
2. Swine influenza. The Merck Veterinary Manual. 2008.<http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/121407.htm>. Retrieved April 30, 2009.
3. Swine Flu India Guide. Everything You Need to Know to Protect Yourself and Your Family. <http://www.swineflu-india.org>
4. International committee of taxonomy of virus."The universal virus database, version 4: Influenza A." Archived from the original on 19 may 2011. Retrieved 14 april 2011.
5. Smith DJ, Lapedes AS, de Jong JC, Bestebroer TM, Rimmelzwaan GF, Osterhaus AD, *et al.* Mapping the antigenic and genetic evolution of influenza virus. Science 2004;305:371-6.
6. Treanor J. Influenza vaccine - outmaneuvering antigenic shift and drift. N Engl J Med 2004; 350:218-20.
7. Thacker E, Janke B. Swine influenza virus: Zoonotic potential and vaccination strategies for the control of

- avian and swine influenzas. J Infect Dis 2008;197:S19-24.
8. Priya Johnson "Swine flu-Ayurveda" last updated august 2009, Available at: <http://www.buzzle.com/articles/swineflu-andayurveda.html>.
9. Agnivesha, Charak Samhita, Vidyotini Hindi commentary, Kashinath Sastri and Gorakhnath Chaturvedi, Sharir sthan 6/24, 8th edition, P. 800, Varanasi, chaukhamba Sanskrit samsthan.
10. Khunt, D.M., Mishra, A.D., Shah, D.R. (2012). Formulation Design & Development of Piroxicam Emulgel. International Journal of PharmTech Research. Vol. 4. No.3. Pg. 1332-1344.
11. Ismuyanto, Imam, Haris. (2013). Gel Fragrances Characteristics With a Variety Patchouli Alcohol Gradeand Patchouli Oil Concentration. Malang: Faculty of Technic University of Brawijaya. Pg.15-18, 25.
12. Patel, G.C., Patel, M.M. (2009). Preliminary Evaluation of Sesbania Seed Gum Mucilage as Gelling Agent. International Journal of PharmTech Research. Vol.1. No.3.Pg. 840-843.
13. Rahmaisni. (2011). Applications of Essential Oils Fragrances on Anti Insect Gel Products. Bogor : Faculty of Agriculture Bogor Institute of Agriculture. Pg. 7-8.
14. Denis. (2010). Air Freshener Formula. Yogyakarta: Faculty of Agriculture University of Gadjah Mada. Pg. 17-19.
15. Patil, P.S. (2014). Natural Excipients: Uses of Pharmaceutical Formulations. International Journal of Pharm Tech Research. Vol.6. No.1.Pg. 21-28.
16. Fitrah, N.A. (2013). Air Freshener Gel Formulations Using Essential oils, Glucomannan and Perfume Oils. Bogor: Faculty of Agriculture Bogor Institute of Agriculture. Pg.5-11.
17. Aslan, M.L. (1998). Seaweed. Yogyakarta: Kanisius. Rosemary Hutagaol /International Journal of ChemTech Research, 2017,10(4): 207-212. 212
18. Yellanki, S.K., Nerella, N.K., Goranti, S., Deb, S.K. (2010). Development of Metronidazole Intravaginal Gel for the Treatment Of Bacterial Vaginosis: Effect of Mucoadhesive Natural Polymers on the Release of Metronidazole. International Journal of PharmTech Research. Vol.2. No.3.Pg. 1746-1750.
19. Winarno, F. (1997). Food Chemistry and Nutrition. Jakarta: Gramedia Pustaka Umum. Pg. 9, 10-18.
20. Kumar, R., Patil, M.B., Patil, S.R., Paschapur, M.S. (2009). Evaluation of Anacardium occidentale Gum as Gelling Agent in Aceclofenac Gel. International Journal of PharmTech Research. Vol.1. No.3. Pg. 695-704.

Cite this article as:

Ayush Kumar Garg, Amit Singh, Harish Vishnoi, Gulab Chand Meena, Chandan Singh, Manoj Adlakha. Swine Flu- The Changing Scenario and Preparedness with Formulation of "Win Flu Air Freshener Gel. International Journal of Ayurveda and Pharma Research. 2017;5(11):14-20.

Source of support: Nil, Conflict of interest: None Declared

*Address for correspondence

Dr. Ayush Kumar Garg

PG Scholar

PG Department of Dravyaguna,

Dr. Sarvapalli Radhakrishnan Raj.

Ayurved University, Rajasthan.

Mo: 9529549315

Email: drayushgarg@gmail.com

Disclaimer: IJAPR is solely owned by Mahadev Publications - A non-profit publications, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJAPR cannot accept any responsibility or liability for the articles content which are published. The views expressed in articles by our contributing authors are not necessarily those of IJAPR editor or editorial board members.