NICOTINE SALT IN ELECTRONIC CIGARETTES: GOOD OR BAD?

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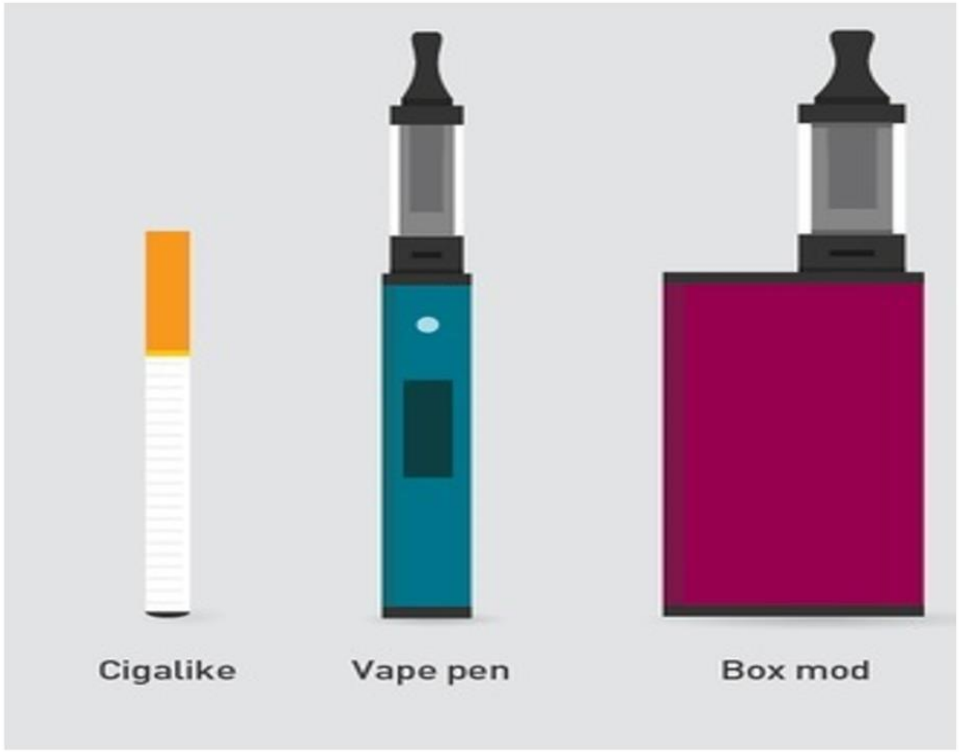
INTRODUCTION

- Electronic cigarettes (EC) are battery-operated devices that heat a solution of propylene glycol, glycerol, nicotine, and few flavourings agents and produce an aerosol that the user inhales.
- ECs were first introduced in China in 2004, later spreading to the global market as a substitute for conventional cigarettes. [1-3]
- In Malaysia, ECs are available in various forms similar to conventional TCGs, USB devices shapes, fountain pens and in numerous box types called Mods. [4]

VARIOUS FORMS OF ELECTRONIC CIGARETTES IN MALAYSIA



NICOTINE

- ***Nicotine*** is a naturally occurring substance in plants e.g. tomatoes, potatoes, eggplant, tobacco, etc.
- Nicotine has stimulant characteristics and contributes to the habit-forming properties of tobacco smoking i.e. addiction.
- When a lesser amount of nicotine concentration reaches the bloodstream, it induces unsatisfactory reactions among consumers due to its positive charge. [5]

WHAT IS FREEBASE NICOTINE EC?

- Freebase nicotine is the nicotine in *pure form* and is *more potent*.

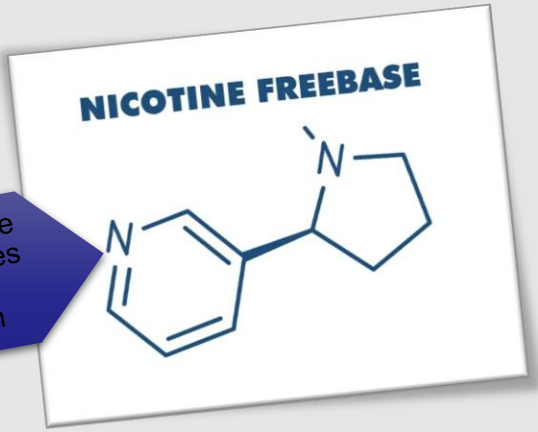
NICOTINE → ***FREEBASE*** **NICOTINE**

Removes the positive charge of nicotine

Brings it into the free state

Moves more easily across membranes in our bodies

Therefore, more nicotine reaches the user's bloodstream



WHAT IS FREEBASE NICOTINE EC? Cont…

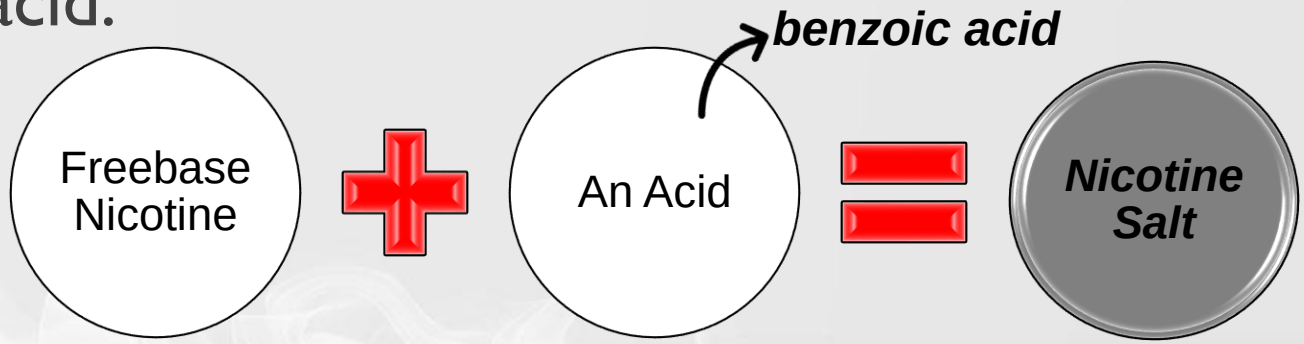
- This is a pure form of nicotine that has a high pH value and alkalinity which produces harsh effects on users' throats.
- Therefore, manufacturers are not able to include high nicotine concentration in e-liquid solutions, which ultimately does not satisfy the vapers.

WHAT IS NICOTINE SALT EC?

In 2015 JUUL Labs a San Francisco-based company introduced the *first nicotine salts electronic cigarette* by brand "JUUL".[6]

How nicotine salt e-liquids are prepared:

The nicotine salts are prepared by combining freebase nicotine i.e. the pure form of nicotine with an acid, normally benzoic acid.



REASON FOR ADDING BENZONIC ACID

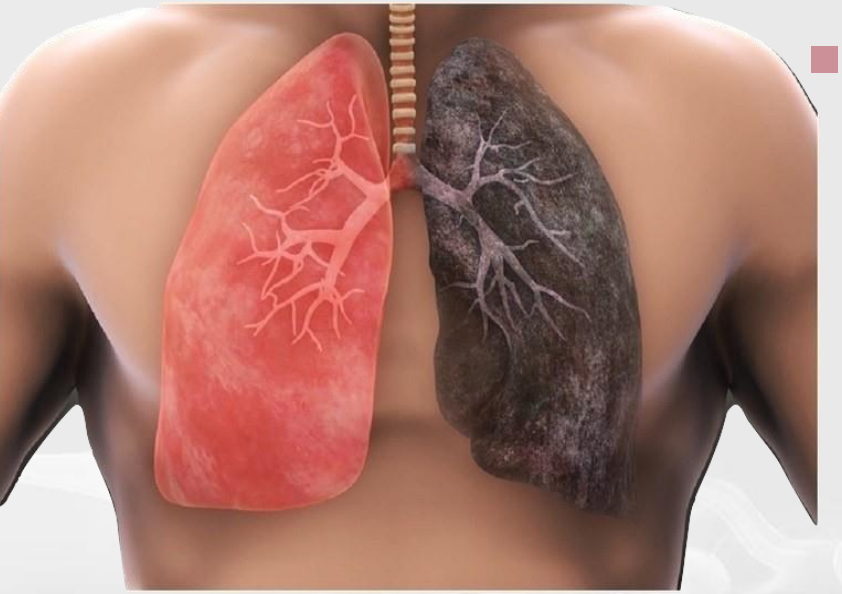
- To decrease the pH closer to neutral pH content that inhibits the harsh effect on user's throats.
- To enhance the absorption of nicotine across the cell membranes inducing more satisfaction and pleasurable effects.
- Nicotine in salt form evaporates at a lower temperature, thus a low battery powered device can be utilised to inhale nicotine.

WHAT ARE THE CURRENT ISSUES?

- Presently the use of nicotine salt ECs is a greatly debatable issue from a scientific point of view.
- A lot of questions were raised about its safety mainly after the eruption of a severe vaping-associated lung illness throughout the US in the year 2019.

WHAT ARE THE CURRENT ISSUES?

- A total of 2,506 hospitalised cases have been reported by the Centers for Disease Control and Prevention (CDC) with 54 deaths confirmed as in 2019. [9]



- Some reports documented that nicotine-containing products are linked to these diseases.[10]

WHAT ARE THE CURRENT ISSUES?

- Furthermore, nicotine salt ECs might promote nicotine addiction in non-smokers especially among the youth and has the potential to result in a relapse for smokers who have stopped

CONCLUSION

Currently, due to inadequate available studies, nicotine salt ECs cannot be confirmed as *safe and hazard free.*

More research is required to look at its long-term safety particularly on smoker's health from different parts of the world including Malaysia.

In view of this, it is important to investigate and establish the long-term safety of these devices for consumer safety.

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