characteristics, user puffing behaviour and nicotine solution concentration.

Optional – List of concise definitions of technical terms or acronyms used in this guideline.

| Term | Definition / Explanation / Details | Source |
|---|---|---|
| | | |
| | | |

# 7. Outcome/ Conclusion

- All e-liquid products (17) analysed contained nicotine
- Nicotine content ranged from 55,000 mg/kg to trace levels (<200 mg/kg)
- All samples did not contain prohibited ingredients. However, the detection limit employed by QH FSS in this analysis was 2000 ppm which is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.



# Version control

Insert details of any changes made to this document. Date to be written in full.

| Version | Date | Comments |
|---|---|---|
| | | *Insert a short explanation of the changes made to the document from the previous version. This summary should* |

| Version | Date | Comments |
|---|---|---|
| | | *assist readers to quickly identify the changes made in each version and implement them if necessary.* |
| | | |
| | | |

| Vaping liquid Samples tested | TGO110 - Prohibited Substances | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Butyraldehyde | 2,4-Butadione | 2,3-Pentadione | Acetoin | Benzaldehyde | Tolualdehyde | Cinnamaldehyde | Vitamin E acetate | Ethylene glycol | Diethylene glycol |
| IGET Bar Strawberry Watermelon Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| Vorteke Melon | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Bar Strawberry Lemon Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Legend Passionfruit Watermelon Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Bar Grape Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Bar Kiwi Pineapple Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Legend Blueberry Blackberry Ice | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| HQD Cuvie Plus - Strawberry Watermelon | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| HQD Cuvie Plus – Passionfruit | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Bar - Peach Ice - 3500 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Bar - Blackberry Ice - 3500 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET XXL - Lush Ice - 1800 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Goat - Cherry Ice - 5000 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| Gunnpod Meta - Grape Ice - 4500 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| Gunnpod Wave - Summer Breeze - 3500 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| IGET Mega - Strawberry Banana Ice - 3000 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |
| Waka Smash - Apple surge - 6000 puffs | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR | >LOR |

## David W

**From:** David W
**Sent:** Wednesday, 17 May 2023 1:50 PM
**To:** U s.73 - Irrelev s.73 - Irrelevant nformation
**Subject:** Outcome Wording??

**Importance:** High

Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to users. The analysis identified that;

- All e-liquid products seventeen (17) samples analysed contained 'illegal' amounts of nicotine. Nicotine content ranged from 55,000 mg/kg to trace levels (<200 mg/kg)
- All samples did not contain prohibited ingredients. However, the detection limit employed by QHFSS in this analysis was 2000 ppm which is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.

Further quantitative analysis is needed to ascertain whether e-liquids contain the prohibited ingredients above the detection limit set under TGO 110.

- Samples (2) contained benzaldehyde (at 28ppm and 66 ppm), which is a prohibited ingredient under TGO 110. This was detected within the carbonyl analysis undertaken by QHFSS.
- All seventeen (17) samples contained various VoCs. Five (5) VoCs are common to all 17 samples.
- All samples contained between five (5) to fifteen (15) heavy metals. A number of these heavy metals are considered toxic including arsenic and zinc, which were detected in all samples. Other heavy metals included lead, mercury, nickel, chromium, antimony, aluminum, iron, nickel, barium, manganese, copper, strontium, and vanadium.

Kind Regards

Queensland Government

**David W**
Advanced Environmental Health Scientist
Environmental Hazards Unit
Health Protection Branch, Queensland Public Health and Scientific Services | Queensland Health

E s.73 - Irrelevant information health.qld.gov.au
W health.qld.gov.au

Queensland Health acknowledges the Traditional Custodians of the land across Queensland, and pays respect to First Nations Elders past, present and future.

## David W

**From:** U
**Sent:** Wednesday, 17 May 2023 1:53 PM
**To:** David W Ri
**Subject:** Draft Report DSW
**Attachments:** Draft Report DSW.docx

# Assessment of e-liquid composition

**For the Queensland Parliament - Health & Environment Committee**

## 1. Purpose

To assess the chemical composition of the e-liquids currently available and used for vaping in Queensland status in Queensland.

## 2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available to Queensland users.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service)

## 3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risk to users. E-Liquids are reported to contain other chemical additives such as flavors, solvents, preservatives and contaminants which may be harmful to health when inhaled as part of vaping.

## 4. Laboratory Analysis

The 17 e-liquid samples were assessed by Queensland Health Forensic and Scientific Services (QHFSS) using the available analytical methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under TGO110 and other substances of concern such as carbonyl compounds, volatile organic compounds, pesticides and heavy metals.

The detection limit for the analytes was determined by QHFSS on the basis of its current analytical capability. This may vary from the compliance limits established for the substances.

# 5. Results and Discussion

The seventeen (17) samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, volatile organic compounds, pesticides and heavy metals including substances that are prohibited by the Therapeutic Goods Administration (TGA). The TGA has identified a range of eight (8) harmful chemicals that should not be detectable in e-liquids under the TGO -110 standard.

E-Liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose a serious health risk to users. These chemical additives and contaminants typically include various carbonyl compounds, volatile organic compounds, and heavy metals.

The results of the seventeen (17) samples are discussed below.

## 5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from 55,000 mg/kg to trace levels (<200 mg/kg).

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml **nicotine.** Vaping products which contain nicotine and sourced from other retailers are illegal under the Act. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user puffing behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation (WHO), nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, as well as neurodegeneration.

## 4.2 Prohibited ingredients

There are eight (8) chemical compounds listed as a prohibited ingredient under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of detection (LoR) of 2000 which is significantly higher (x 200) than the compliance limit set under the TGO 110.

Further analysis may need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should, however, be noted that Benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in the carbonyl analysis in two (2) of the samples, at 28ppm and 66 ppm (note 1 mg/kg = 1ppm), which is above the limit set by TGO 110 (< 10 ppm).

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110 includes irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

## Table 1 - Nicotine

| Lab Analysis | IGET Bar Strawberry Watermelon Ice | Vorteke Melon | IGET Bar Strawberry Lemon Ice | IGET Legend Passionfruit Watermelon Ice | IGET Bar Grape Ice | IGET Bar Kiwi Pineapple Ice | IGET Legend Blueberry Blackberry Ice | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus – Passionfruit |
|---|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | Present | Present |
| Concentration (mg/kg) | 45,000 | <200 | 54,000 | 52,000 | 49,000 | 55,000 | 47,000 | 38,000 | 44,000 |

| Lab Analysis | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Gra Ice - 4500 puffs | Gunnpod Wave - Su Breeze - 3500 pu | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | |
| Concentration (mg/kg) | | | | | | | | |

## Table 2 – Prohibited substances

*Note - LOR is 2000 ppm*

| Vaping liquid Samples tested | TGO110 - Prohibited Substances | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2,4-Butadione | 2,3-Pentadione | Acetoin | Benzaldehyde | Cinnamaldehyde | Vitamin E acetate | Ethylene glycol | Diethylene glycol |
| IGET Bar Strawberry Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Vorteke Melon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Strawberry Lemon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Passionfruit Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Grape Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Kiwi Pineapple Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Blueberry Blackberry Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus - Strawberry Watermelon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus – Passionfruit | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Peach Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Blackberry Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET XXL - Lush Ice - 1800 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Goat - Cherry Ice - 5000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Meta - Grape Ice - 4500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Wave - Summer Breeze - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Mega - Strawberry Banana Ice - 3000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Waka Smash - Apple surge - 6000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |

## 5.3 Other Chemicals of Concern

### 5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least 2 (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

### 5.3.2 Volatile Organic Compounds

Volatile organic compounds (VoC) are gases are typically industrial chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VoCs. Five (5) VoCs are common to all 17 samples. These are propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of liquid e-cigarettes. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VoCs detected are not known to pose health risks, some of are reported to cause, and many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

### 5.3.3 Heavy Metals

All samples contained between five to 15 heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified included lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases, including cancer. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

# 6. Summary of Results



- All of the seventeen (17) samples of e-liquid products analysed contained nicotine. The nicotine content ranged from 55,000 mg/kg to trace levels (<200 mg/kg)

- None of the seventeen (17) samples recorded prohibited ingredients above the laboratory detection limit of 2000ppm. The detection limit employed by QH FSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in the carbonyl analysis in 2 of the samples, at 28ppm and 66 ppm which is above the limit set by TGO 110 (< 10 ppm).
- All 17 samples contained various VoCs. Five (5) VoCs are common to all 17 samples.

## David W

**From:** Ri s.73 - Irrelev s.73 - Irrelevant information
**Sent:** Wednesday, 17 May 2023 2:52 PM
**To:** David W
**Subject:** Draft Report Final U s.73 - Irrelev DSW RA
**Attachments:** Draft Report Final U s.73 - Irrele DSW RA.docx

Dave,

My suggestion in track changes.

# Assessment of e-liquid composition

**For the Queensland Parliament - Health & Environment Committee**

## 1. Purpose

To assess the chemical composition of e-liquids that are currently in vaping products available in Queensland.

## 2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available to Queensland vape users.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service).

## 3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risks to users. E-liquids are reported to contain other chemical additives such as flavors, solvents, preservatives and contaminants that may be harmful to health when inhaled as part of vaping.

## 4. Laboratory Analysis

The 17 e-liquid samples were analysed by Queensland Health Forensic and Scientific Services (QH FSS) using the available laboratory methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under Therapeutic Goods Administration's Therapeutic Goods (Standard for Nicotine Vaping Products) (TGO 110) Order 2021 (TGO 110), and other substances of concern such as carbonyl compounds, volatile organic compounds (VOCs), pesticides/fungicides/herbicides, and heavy metals.



The detection limit for the analytes was determined by QH FSS based on its current analytical capability. This may vary from the compliance limits established for the substances.

# 5. Results and Discussion

The 17 samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, VOCs, pesticides and heavy metals, and eight substances that are prohibited ingredients in vapes under the TGO 110. .

E-liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose serious health risk to vape users. These chemical additives and contaminants typically include various carbonyl compounds, VOCs, and heavy metals.

The results of the 17 samples are discussed below.

## 5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from 55,000 mg/kg to trace levels (<200 mg/kg).

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml of **nicotine.** Vaping products which contain nicotine and are sourced from other retailers are illegal under the *Medicines and Poisons Act 2019*. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user puffing behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation , nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, as well as neurodegeneration.

## 4.2 Prohibited ingredients

There are eight chemical compounds listed as prohibited ingredients under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of reporting (LoR) or limit of

detention of 2000ppm which is significantly higher (x200) than the compliance limit set under the TGO 110.

Further analysis may need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should, however, be noted that benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in the carbonyl analysis in two  of the samples, at 28ppm and 66ppm (note 1 mg/kg = 1ppm), which is above the limit set by TGO 110 (<10 ppm).

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110. Theseinclude irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

## Table 1 - Nicotine

| Lab Analysis (Limit of Reporting: 200 mg/kg) | IGET Bar Strawberry Watermelon Ice | Vorteke Melon | IGET Bar Strawberry Lemon Ice | IGET Legend Passionfruit Watermelon Ice | IGET Bar Grape Ice | IGET Bar Kiwi Pineapple Ice | IGET Legend Blueberry Blackberry Ice | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus – Passionfruit |
|---|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | Present | Present |
| Concentration (mg/kg) | 45,000 | <200 | 54,000 | 52,000 | 49,000 | 55,000 | 47,000 | 38,000 | 44,000 |

| Lab Analysis | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Gra Ice - 4500 puffs | Gunnpod Wave - Su Breeze - 3500 pu | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | |
| Concentration (mg/kg) | 37,000 | 33,000 | <200 | 28,000 | 30,000 | 12,000 | 35,000 | 30,000 |

## Table 2 – Prohibited substances

| Vaping liquid Samples tested (Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg)) | TGO110 - Prohibited Substances | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2,4-Butadione | 2,3-Pentadione | Acetoin | Benzaldehyde | Cinnamaldehyde | Vitamin E acetate | Ethylene glycol | Diethylene glycol |
| IGET Bar Strawberry Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Vorteke Melon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Strawberry Lemon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Passionfruit Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Grape Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Kiwi Pineapple Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Blueberry Blackberry Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus - Strawberry Watermelon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus – Passionfruit | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Peach Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Blackberry Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET XXL - Lush Ice - 1800 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Goat - Cherry Ice - 5000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Meta - Grape Ice - 4500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Wave - Summer Breeze - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Mega - Strawberry Banana Ice - 3000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Waka Smash - Apple surge - 6000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |

## 5.3 Other Chemicals of Concern

### 5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least two (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

### 5.3.2 Volatile Organic Compounds

VOCs are gases are typically industrial chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VOCs. Five VOCs are common to all 17 samples: propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of e-liquids. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VOCs detected are not known to pose health risks, some of are reported to cause, and many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

### 5.3.3 Heavy Metals

All samples contained between five to 15 heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified include lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases, including cancer. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

# 6. Summary of Results



Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to vape users. The analysis identified that;

- All of the 17 samples of e-liquid products analysed contained nicotine. The nicotine content ranged from trace levels (<200 mg/kg) to 55,000 mg/kg.

- None of the 17 samples recorded prohibited ingredients above the laboratory detection limit of 2000 ppm. The detection limit employed by QH FSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Benzaldehyde, which is a prohibited ingredient under TGO 110, was detected through the carbonyl analysis in two of the samples, at 28ppm and 66ppm which is above the limit set by TGO 110 (<10 ppm).
- All 17 samples contained various VOCs. Five (5) VOCs are common to all 17 samples.
- All samples contained between five 5 to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, which were detected in all samples.

## David W

**From:** David P
**Sent:** Wednesday, 17 May 2023 3:53 PM
**To:** Jim s.73 - Irrelevant information; Ri s.73 - Irreley s.73 - Irrelevant information
**Subject:** Amended reports for e-cigarette fluids
**Attachments:** SSP83249_QH_EnvHazUnit_NicotineTGAPestMetals_Amended.pdf; SSP83440_QH_EnvCommittee_Report_Amended.pdf

G'day Jim, Ri s.73 - Irreleva

Apologies for this but the reports have come back from peer review with some errors. Due to the urgent turnaround I submitted these prior to peer review, usually this just brings up typos but this time it has shown there were transcription errors as well.

These are:

- A cut and paste issue with the aldehydes in both SSP83249 and SSP83440 – acetone was missing from the word document so the lines are out of step with the excel data
- Errors were made in inputting nicotine fluid masses into the calculation spreadsheet for nicotine calculations for SSP83440

Many apologies for this. This is the first time I've run series of tests for the e-fluids and there's a lot of manual handling. Future transcriptions will be done by VBA macros and will eliminate these types of problems.

David

**David P**
Senior Chemist

**Organics Laboratory**

**Forensic and Scientific Services**
Prevention Division Queensland Health

p s.73 - Irrelevant information
a 39 Kessels Road Coopers Plains Qld 4108
e s.73 - Irrelevant information health.qld.gov.au w **www.health.qld.gov.au/fss**

*Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and emerging.*

Queensland Government

Forensic and Scientific Services

# CERTIFICATE OF ANALYSIS

**CLIENT:** QH – Environmental Hazards Unit
16 Butterfield St

HERSTON QLD 4006

ATTN: Jim [redacted]

**CC:**

| | |
|---|---|
| Laboratory Reference | : SSP83249 |
| Client Order Number | : n/a |
| Quote Number | : n/a |
| Client Project | : n/a |
| Client Batch Reference | : n/a |
| Date Received | : 13-Apr-2023 |
| Date Commenced | : 13-Apr-2023 |
| Laboratory Number/s | : 23KS870-879 |

Submitting Authority : Queensland Health Environmental Hazards unit

Number of Samples : Ten (10) e-cigarette devices

Reason for Analysis : Quantitation of nicotine
Quantitation of compounds outlined in Subsection 7(3) Schedule 1 of the TGA document TGO 110
Quantitation of carbonyl compounds
Pesticide/Herbicide Screens
Heavy metals screen

Method/s of Analysis : QIS34310 – Nicotine Analysis

QIS15506 - Qualitative and/or Quantitative Analysis using Liquid Chromatography Separation with Mass Spectrometer Detection

QIS12659 - Determination of Trace Elements in Foods by ICP-MS after Microwave Digestion

QIS12792 – Analysis of drugs by classical (Pharmacopeia), GC, GCMS, HPLC, UV/VIS HPLC/MS methods

Remarks : Sample details and results are summarised in Tables 1 - 6

s.73 - Irrelevant information

David P[redacted]
Senior Chemist, Organics Laboratory
15th May 2023







**Enquiries** David P[redacted] | 39 Kessels Road, Coopers Plains QLD 4108, AUSTRALIA | PO Box 594, Archerfield QLD 4108, AUSTRALIA | **Phone** s.73 - Irrelevant information | **Fax** (+61 7) s.73 - Irrelevant information
**Phone** s.73 - Irrelevant information | **Email** s.73 - Irrelevant information @health.qld.gov.au | **Email** [redacted]@health.qld.gov.au

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

**Table 1: Nicotine Results for SSP83249**

| Lab No. | Sample Reference | Sample Description | Results (mg/kg) |
|---|---|---|---|
| **23KS870** | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | **38000** |
| **23KS871** | 22KS5570 | HQD Cuvie Plus - Passionfruit | **44000** |
| **23KS872** | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | **37000** |
| **23KS873** | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | **33000** |
| **23KS874** | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | < LOR |
| **23KS875** | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | **28000** |
| **23KS876** | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | **30000** |
| **23KS877** | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | **12000** |
| **23KS878** | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | **35000** |
| **23KS879** | 23KS313 | Waka Smash - Apple surge - 6000 puffs | **30000** |

Limit of Reporting (< LOR) – 200 mg/kg

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

Table 2: Carbonyl results for SSP83249

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| Sample Type | | | | liquid | liquid | liquid | liquid | liquid |
| Sampling Time / Date | | | | n/a | n/a | n/a | n/a | n/a |
| Sample Description | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| Method | Analysis for drugs by GCMS | Units | Reporting Limit | 23KS870 | 23KS871 | 23KS872 | 23KS873 | 23KS874 |
| 12792 | Formaldehyde | mg/kg | 20 | 220* | 160 | 210 | 120 | 180 |
| 12792 | Acetaldehyde | mg/kg | 20 | 190 | 200 | 32 | 31 | 46 |
| 12792 | Acrolein | mg/kg | 20 | 35 | 36 | 21 | 20 | 25 |
| 12792 | Propionaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Hexaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | p-Tolualdehyde | mg/kg | 20 | 66 | 29 | 70 | < LOR | < LOR |

Table 2: Carbonyl results for SSP83249

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| Sample Type | | | | liquid | liquid | liquid | liquid | liquid |
| Sampling Time / Date | | | | n/a | n/a | n/a | n/a | n/a |
| Sample Description | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| Method | Analysis for drugs by GCMS | Units | Reporting Limit | 23KS875 | 23KS876 | 23KS877 | 23KS878 | 23KS879 |
| 12792 | Formaldehyde | mg/kg | 20 | 130 | 190 | 140 | 380* | 130 |
| 12792 | Acetaldehyde | mg/kg | 20 | 26 | 110 | 120 | 250 | 70 |
| 12792 | Acrolein | mg/kg | 20 | < LOR | 44 | 49 | 37 | 48 |
| 12792 | Propionaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Hexaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 20 | < LOR | < LOR | 28 | < LOR | 66 |
| 12792 | p-Tolualdehyde | mg/kg | 20 | 680* | 67 | < LOR | 76 | < LOR |

* Above top calibration standard – estimate only

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

**Table 3: Results for TGO 110 compounds**

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| Sample Type | | | | liquid | liquid | liquid | liquid | liquid |
| Sampling Time / Date | | | | n/a | n/a | n/a | n/a | n/a |
| Sample Description | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| Method | Analysis for drugs by GCMS | Units | Reporting Limit | 23KS870 | 23KS871 | 23KS872 | 23KS873 | 23KS874 |
| 12792 | Butyraldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,4-Butadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,3-Pentadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Acetoin | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Tolualdehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Cinnamaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 15506* | Vitamin E acetate | mg/kg | 50 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Ethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Diethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |

**Table 3: Results for TGO 110 compounds**

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| Sample Type | | | | liquid | liquid | liquid | liquid | liquid |
| Sampling Time / Date | | | | n/a | n/a | n/a | n/a | n/a |
| Sample Description | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| Method | Analysis for drugs by GCMS | Units | Reporting Limit | 23KS875 | 23KS876 | 23KS877 | 23KS878 | 23KS879 |
| 12792 | Butyraldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,4-Butadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,3-Pentadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Acetoin | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Tolualdehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Cinnamaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 15506* | Vitamin E acetate | mg/kg | 50 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Ethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Diethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |

* Analysed by QIS 15506 - Qualitative and/or Quantitative Analysis using Liquid Chromatography Separation with Mass Spectrometer Detection (LC-Orbitrap)

Table 4: General Organic Screen by LC-Orbitrap (Pesticides/Herbicides/Fungicides) for SSP83249

| Lab No. | Sample Reference | Sample Description | Compounds detected |
|---|---|---|---|
| 23KS870 | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | Nicotine |
| 23KS871 | 22KS5570 | HQD Cuvie Plus - Passionfruit | Nicotine |
| 23KS872 | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | Nicotine |
| 23KS873 | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | Nicotine |
| 23KS874 | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | Nil |
| 23KS875 | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | Nicotine |
| 23KS876 | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | Nicotine |
| 23KS877 | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | Nicotine |
| 23KS878 | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | Nicotine |
| 23KS879 | 23KS313 | Waka Smash - Apple surge - 6000 puffs | Nicotine |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

## Table 5: General Organic Screen by GCMS (Volatile Organic Compounds) for SSP83249

| Lab No. | Sample Reference | Sample Description | Compounds detected |
|---|---|---|---|
| 23KS870 | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Ethyl Maltol, Methyl Cinnamate, Gamma-decanolactone, Hedione |
| 23KS871 | 22KS5570 | HQD Cuvie Plus - Passionfruit | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Gamma-decanolactone |
| 23KS872 | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Neomenthol, Gamma-decanolactone, Gamma-heptylbutyrolactone |
| 23KS873 | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, 1,2-Propanediol-1-acetate, Neomenthol, Hydrocinnamic acid, Gamma-heptylbutyrolactone |
| 23KS874 | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Vanillin, Gamma-decanolactone, Hedione |
| 23KS875 | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Benzaldehyde, Neomenthol, Benzaldehyde propylene glycol acetal, 4-Acetylanisole, |
| 23KS876 | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Ethyl butyrate, 3-Hexene-1-ol, Menthol, Ethyl Maltol, Methyl Anthranilate, Methyl Methanthranilate, Gamma-decanolactone, N-ethyl Dodecanamide |
| 23KS877 | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Methylbutyric acid, Butoxyethanol, Ethyl Maltol, Gamma-decanolactone |
| 23KS878 | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Banana oil, Neomenthol, Ethyl Maltol, Gamma-decanolactone |
| 23KS879 | 23KS313 | Waka Smash - Apple surge - 6000 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Ethyl butyrate, 3-Hexene-1-ol, Banana oil, Hexyl alcohol, Hexyl caproate, Isoamyl butanoate, Ethyl succinate, Benzyl acetate, Methyl cinnamate, Vanillin, Isopropyl cinnamate, Ethyl vanillin, Gamma-heptylbutyrolactone |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 6: Results for Heavy Metal analysis#**

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| Sample Type | | | | liquid | liquid | liquid | liquid | liquid |
| Sampling Time / Date | | | | n/a | n/a | n/a | n/a | n/a |
| Sample Description | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| Method | Vegetation ICP-MS analysis | Units | Reporting Limit | 23KS870 | 23KS871 | 23KS872 | 23KS873 | 23KS874 |
| 12659 | Aluminium | mg/kg | 0.1 | 0.29 | 0.24 | 0.57 | 0.13 | 0.8 |
| 12659 | Vanadium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Chromium | mg/kg | 0.01 | 0.059 | 0.079 | 0.079 | 0.083 | 0.12 |
| 12659 | Manganese | mg/kg | 0.01 | 0.047 | 0.04 | 0.037 | 0.02 | 0.015 |
| 12659 | Iron | mg/kg | 0.1 | 0.33 | 0.36 | 0.8 | 0.34 | 0.52 |
| 12659 | Cobalt | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Nickel | mg/kg | 0.01 | 0.049 | 0.061 | 0.038 | 0.017 | 0.09 |
| 12659 | Copper | mg/kg | 0.05 | < LOR | 0.05 | 0.21 | 0.13 | 0.62 |
| 12659 | Zinc | mg/kg | 0.05 | 1.4 | 1.1 | 1.4 | 1.2 | 1.2 |
| 12659 | Arsenic | mg/kg | 0.005 | 0.025 | 0.049 | 0.052 | 0.053 | 0.049 |
| 12659 | Selenium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Strontium | mg/kg | 0.01 | 0.03 | 0.02 | 0.03 | 0.01 | 0.01 |
| 12659 | Molybdenum | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Silver | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Cadmium | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Tin | mg/kg | 0.05 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Antimony | mg/kg | 0.01 | 0.49 | 0.53 | 0.55 | 0.82 | 0.67 |
| 12659 | Barium | mg/kg | 0.01 | 0.022 | 0.013 | 0.031 | 0.011 | 0.015 |
| 12659 | Mercury | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Lead | mg/kg | 0.005 | < LOR | 0.012 | 0.005 | 0.009 | < LOR |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 6: Results for Heavy Metal analysis (con't)#**

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| **Method** | **Vegetation ICP-MS analysis** | **Units** | **Reporting Limit** | **23KS875** | **23KS876** | **23KS877** | **23KS878** | **23KS879** |
| 12659 | Aluminium | mg/kg | 0.1 | < LOR | **0.11** | < LOR | **3.1** | < LOR |
| 12659 | Vanadium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Chromium | mg/kg | 0.01 | **0.064** | **0.089** | **0.077** | **0.082** | **0.083** |
| 12659 | Manganese | mg/kg | 0.01 | **0.023** | **0.027** | **0.13** | **0.028** | **0.026** |
| 12659 | Iron | mg/kg | 0.1 | **0.19** | **0.59** | **0.47** | **2** | **0.57** |
| 12659 | Cobalt | mg/kg | 0.01 | < LOR | **0.027** | < LOR | < LOR | < LOR |
| 12659 | Nickel | mg/kg | 0.01 | **0.015** | **0.41** | **0.47** | **1.2** | **0.037** |
| 12659 | Copper | mg/kg | 0.05 | < LOR | **28** | **0.85** | **71** | < LOR |
| 12659 | Zinc | mg/kg | 0.05 | **3.6** | **22** | **3.2** | **63** | **1.6** |
| 12659 | Arsenic | mg/kg | 0.005 | **0.052** | **0.046** | **0.062** | **0.06** | **0.081** |
| 12659 | Selenium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Strontium | mg/kg | 0.01 | < LOR | < LOR | **0.02** | **0.02** | **0.03** |
| 12659 | Molybdenum | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Silver | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Cadmium | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Tin | mg/kg | 0.05 | < LOR | **0.29** | < LOR | **1.2** | < LOR |
| 12659 | Antimony | mg/kg | 0.01 | **0.04** | **0.89** | **0.64** | **0.92** | **0.05** |
| 12659 | Barium | mg/kg | 0.01 | **0.01** | **0.016** | **0.061** | **0.023** | **0.022** |
| 12659 | Mercury | mg/kg | 0.005 | < LOR | < LOR | < LOR | **0.013** | < LOR |
| 12659 | Lead | mg/kg | 0.005 | < LOR | **2.4** | < LOR | **8.8** | < LOR |

# Tobacco samples were prepared for analysis by microwave digestion in nitric acid according to method QIS12659v8 "Determination of Trace Elements in Foods by ICP-MS after Microwave Digestion". This method is applicable to the determination of trace elements (Al, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Mo, Ag, Cd, Sn, Sb, Ba, Hg, Pb) in a wide variety of food samples, including plants.
The resultant digest solution was then analysed by Triple Quadrupole Inductively Coupled - Mass Spectrometer (QQQ ICP-MS) for the aforementioned list of metals using instrument method QIS27441v5 "Determination of Trace Elements in Aqueous Solutions by ICP-MS".
The Inorganic Chemistry laboratory is accredited by NATA as compliant with ISO/IEC17025 (2017) for methods QIS12659v8 and QIS12659v5. Tobacco is dried plant material and therefore aligns to herbs, vegetables and vegetable products which are included in the current scope of accreditation for the Inorganic Chemistry laboratory. Tobacco is therefore covered under the scope of accreditation.

Queensland Government

Forensic and Scientific Services

# CERTIFICATE OF ANALYSIS

**CLIENT:** QH – Environmental Hazards Unit
16 Butterfield St

HERSTON QLD 4006

ATTN: Jim

**CC**:

| | |
|---|---|
| Laboratory Reference | : SSP83249 |
| Client Order Number | : n/a |
| Quote Number | : n/a |
| Client Project | : n/a |
| Client Batch Reference | : n/a |
| Date Received | : 13-Apr-2023 |
| Date Commenced | : 13-Apr-2023 |
| Laboratory Number/s | : 23KS870-879 |

Submitting Authority : Queensland Health Environmental Hazards unit

Number of Samples : Ten (10) e-cigarette devices

Reason for Analysis : Quantitation of nicotine
Quantitation of compounds outlined in Subsection 7(3) Schedule 1 of the TGA document TGO 110
Quantitation of carbonyl compounds
Pesticide/Herbicide Screens
Heavy metals screen

Method/s of Analysis : QIS34310 – Nicotine Analysis

QIS15506 - Qualitative and/or Quantitative Analysis using Liquid Chromatography Separation with Mass Spectrometer Detection

QIS12659 - Determination of Trace Elements in Foods by ICP-MS after Microwave Digestion

QIS12792 – Analysis of drugs by classical (Pharmacopeia), GC, GCMS, HPLC, UV/VIS HPLC/MS methods

Remarks : Sample details and results are summarised in Tables 1 - 6

.....
David P
Senior Chemist, Organics Laboratory
15th May 2023







**Enquiries** David Pa
**Phone** s.73 - Irrelevant information
**Email** s.73 - Irrelevant information health.qld.gov.au

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# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

**Table 1: Nicotine Results for SSP83249**

| Lab No. | Sample Reference | Sample Description | Results (mg/kg) |
|---|---|---|---|
| **23KS870** | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | **38000** |
| **23KS871** | 22KS5570 | HQD Cuvie Plus - Passionfruit | **44000** |
| **23KS872** | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | **37000** |
| **23KS873** | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | **33000** |
| **23KS874** | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | < LOR |
| **23KS875** | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | **28000** |
| **23KS876** | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | **30000** |
| **23KS877** | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | **12000** |
| **23KS878** | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | **35000** |
| **23KS879** | 23KS313 | Waka Smash - Apple surge - 6000 puffs | **30000** |

Limit of Reporting (< LOR) – 200 mg/kg

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

**Table 2: Carbonyl results for SSP83249**

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| **Method** | **Analysis for drugs by GCMS** | **Units** | **Reporting Limit** | **23KS870** | **23KS871** | **23KS872** | **23KS873** | **23KS874** |
| 12792 | Formaldehyde | mg/kg | 20 | **220*** | **160** | **210** | **120** | **180** |
| 12792 | Acetaldehyde | mg/kg | 20 | **190** | **200** | **32** | **31** | **46** |
| 12792 | Acrolein | mg/kg | 20 | **35** | **36** | **21** | **20** | **25** |
| 12792 | Propionaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Hexaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | p-Tolualdehyde | mg/kg | 20 | **66** | **29** | **70** | < LOR | < LOR |

**Table 2: Carbonyl results for SSP83249 (con't)**

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| **Method** | **Analysis for drugs by GCMS** | **Units** | **Reporting Limit** | **23KS875** | **23KS876** | **23KS877** | **23KS878** | **23KS879** |
| 12792 | Formaldehyde | mg/kg | 20 | **130** | **190** | **140** | **380*** | **130** |
| 12792 | Acetaldehyde | mg/kg | 20 | **26** | **110** | **120** | **250** | **70** |
| 12792 | Acrolein | mg/kg | 20 | < LOR | **44** | **49** | **37** | **48** |
| 12792 | Propionaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Hexaldehyde | mg/kg | 20 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 20 | < LOR | < LOR | **28** | < LOR | **66** |
| 12792 | p-Tolualdehyde | mg/kg | 20 | **680*** | **67** | < LOR | **76** | < LOR |

* Above top calibration standard – estimate only

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249
Laboratory Number: 23KS870-879

**Table 3: Results for TGO 110 compounds**

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| **Method** | **Analysis for drugs by GCMS** | **Units** | **Reporting Limit** | **23KS870** | **23KS871** | **23KS872** | **23KS873** | **23KS874** |
| 12792 | Butyraldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,4-Butadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,3-Pentadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Acetoin | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Tolualdehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Cinnamaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| **15506*** | **Vitamin E acetate** | mg/kg | 50 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Ethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Diethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |

**Table 3: Results for TGO 110 compounds (con't)**

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| **Method** | **Analysis for drugs by GCMS** | **Units** | **Reporting Limit** | **23KS875** | **23KS876** | **23KS877** | **23KS878** | **23KS879** |
| 12792 | Butyraldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,4-Butadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | 2,3-Pentadione | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Acetoin | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Benzaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Tolualdehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Cinnamaldehyde | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| **15506*** | **Vitamin E acetate** | mg/kg | 50 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Ethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12792 | Diethylene glycol | mg/kg | 2000 | < LOR | < LOR | < LOR | < LOR | < LOR |

* Analysed by QIS 15506 - Qualitative and/or Quantitative Analysis using Liquid Chromatography Separation with Mass Spectrometer Detection (LC-Orbitrap)

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 4: General Organic Screen by LC-Orbitrap (Pesticides/Herbicides/Fungicides) for SSP83249**

| Lab No. | Sample Reference | Sample Description | Compounds detected |
|---|---|---|---|
| **23KS870** | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | Nicotine |
| **23KS871** | 22KS5570 | HQD Cuvie Plus - Passionfruit | Nicotine |
| **23KS872** | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | Nicotine |
| **23KS873** | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | Nicotine |
| **23KS874** | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | Nil |
| **23KS875** | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | Nicotine |
| **23KS876** | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | Nicotine |
| **23KS877** | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | Nicotine |
| **23KS878** | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | Nicotine |
| **23KS879** | 23KS313 | Waka Smash - Apple surge - 6000 puffs | Nicotine |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 5: General Organic Screen by GCMS (Volatile Organic Compounds) for SSP83249**

| Lab No. | Sample Reference | Sample Description | Compounds detected |
|---|---|---|---|
| **23KS870** | 22KS5561 | HQD Cuvie Plus - Strawberry Watermelon | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Ethyl Maltol, Methyl Cinnamate, Gamma-decanolactone, Hedione |
| **23KS871** | 22KS5570 | HQD Cuvie Plus - Passionfruit | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Gamma-decanolactone |
| **23KS872** | 22KS6288 | IGET Bar - Peach Ice - 3500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Neomenthol, Gamma-decanolactone, Gamma-heptylbutyrolactone |
| **23KS873** | 22KS6292 | IGET Bar - Blackberry Ice - 3500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, 1,2-Propanediol-1-acetate, Neomenthol, Hydrocinnamic acid, Gamma-heptylbutyrolactone |
| **23KS874** | 22KS6328 | IGET XXL - Lush Ice - 1800 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Vanillin, Gamma-decanolactone, Hedione |
| **23KS875** | 23KS297 | IGET Goat - Cherry Ice - 5000 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Benzaldehyde, Neomenthol, Benzaldehyde propylene glycol acetal, 4-Acetylanisole, |
| **23KS876** | 23KS298 | Gunnpod Meta - Grape Ice - 4500 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Ethyl butyrate, 3-Hexene-1-ol, Menthol, Ethyl Maltol, Methyl Anthranilate, Methyl Methanthranilate, Gamma-decanolactone, N-ethyl Dodecanamide |
| **23KS877** | 23KS299 | Gunnpod Wave - Summer Breeze - 3500 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Methylbutyric acid, Butoxyethanol, Ethyl Maltol, Gamma-decanolactone |
| **23KS878** | 23KS301 | IGET Mega - Strawberry Banana Ice - 3000 puffs | Propylene glycol, Glycerin, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, 3-Hexene-1-ol, Banana oil, Neomenthol, Ethyl Maltol, Gamma-decanolactone |
| **23KS879** | 23KS313 | Waka Smash - Apple surge - 6000 puffs | Propylene glycol, Glycerin, Nicotine, 2-Isopropyl-N,2,3-trimethylbutanamide (WS-23), Benzoic acid, Ethyl butyrate, 3-Hexene-1-ol, Banana oil, Hexyl alcohol, Hexyl caproate, Isoamyl butanoate, Ethyl succinate, Benzyl acetate, Methyl cinnamate, Vanillin, Isopropyl cinnamate, Ethyl vanillin, Gamma-heptylbutyrolactone |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 6: Results for Heavy Metal analysis#**

| Client Reference | | | | 22KS5561 | 22KS5570 | 22KS6288 | 22KS6292 | 22KS6328 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus - Passionfruit | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs |
| **Method** | **Vegetation ICP-MS analysis** | **Units** | **Reporting Limit** | **23KS870** | **23KS871** | **23KS872** | **23KS873** | **23KS874** |
| 12659 | Aluminium | mg/kg | 0.1 | **0.29** | **0.24** | **0.57** | **0.13** | **0.8** |
| 12659 | Vanadium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Chromium | mg/kg | 0.01 | **0.059** | **0.079** | **0.079** | **0.083** | **0.12** |
| 12659 | Manganese | mg/kg | 0.01 | **0.047** | **0.04** | **0.037** | **0.02** | **0.015** |
| 12659 | Iron | mg/kg | 0.1 | **0.33** | **0.36** | **0.8** | **0.34** | **0.52** |
| 12659 | Cobalt | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Nickel | mg/kg | 0.01 | **0.049** | **0.061** | **0.038** | **0.017** | **0.09** |
| 12659 | Copper | mg/kg | 0.05 | < LOR | **0.05** | **0.21** | **0.13** | **0.62** |
| 12659 | Zinc | mg/kg | 0.05 | **1.4** | **1.1** | **1.4** | **1.2** | **1.2** |
| 12659 | Arsenic | mg/kg | 0.005 | **0.025** | **0.049** | **0.052** | **0.053** | **0.049** |
| 12659 | Selenium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Strontium | mg/kg | 0.01 | **0.03** | **0.02** | **0.03** | **0.01** | **0.01** |
| 12659 | Molybdenum | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Silver | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Cadmium | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Tin | mg/kg | 0.05 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Antimony | mg/kg | 0.01 | **0.49** | **0.53** | **0.55** | **0.82** | **0.67** |
| 12659 | Barium | mg/kg | 0.01 | **0.022** | **0.013** | **0.031** | **0.011** | **0.015** |
| 12659 | Mercury | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Lead | mg/kg | 0.005 | < LOR | **0.012** | **0.005** | **0.009** | < LOR |

# CERTIFICATE OF ANALYSIS

Laboratory Reference: SSP83249

Laboratory Number: 23KS870-879

**Table 6: Results for Heavy Metal analysis (con't)[#]**

| Client Reference | | | | 23KS297 | 23KS298 | 23KS299 | 23KS301 | 23KS313 |
|---|---|---|---|---|---|---|---|---|
| **Sample Type** | | | | **liquid** | **liquid** | **liquid** | **liquid** | **liquid** |
| **Sampling Time / Date** | | | | n/a | n/a | n/a | n/a | n/a |
| **Sample Description** | | | | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Grape Ice - 4500 puffs | Gunnpod Wave - Summer Breeze - 3500 puffs | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
| **Method** | **Vegetation ICP-MS analysis** | **Units** | **Reporting Limit** | **23KS875** | **23KS876** | **23KS877** | **23KS878** | **23KS879** |
| 12659 | Aluminium | mg/kg | 0.1 | < LOR | **0.11** | < LOR | **3.1** | < LOR |
| 12659 | Vanadium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Chromium | mg/kg | 0.01 | **0.064** | **0.089** | **0.077** | **0.082** | **0.083** |
| 12659 | Manganese | mg/kg | 0.01 | **0.023** | **0.027** | **0.13** | **0.028** | **0.026** |
| 12659 | Iron | mg/kg | 0.1 | **0.19** | **0.59** | **0.47** | **2** | **0.57** |
| 12659 | Cobalt | mg/kg | 0.01 | < LOR | **0.027** | < LOR | < LOR | < LOR |
| 12659 | Nickel | mg/kg | 0.01 | **0.015** | **0.41** | **0.47** | **1.2** | **0.037** |
| 12659 | Copper | mg/kg | 0.05 | < LOR | **28** | **0.85** | **71** | < LOR |
| 12659 | Zinc | mg/kg | 0.05 | **3.6** | **22** | **3.2** | **63** | **1.6** |
| 12659 | Arsenic | mg/kg | 0.005 | **0.052** | **0.046** | **0.062** | **0.06** | **0.081** |
| 12659 | Selenium | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Strontium | mg/kg | 0.01 | < LOR | < LOR | **0.02** | **0.02** | **0.03** |
| 12659 | Molybdenum | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Silver | mg/kg | 0.01 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Cadmium | mg/kg | 0.005 | < LOR | < LOR | < LOR | < LOR | < LOR |
| 12659 | Tin | mg/kg | 0.05 | < LOR | **0.29** | < LOR | **1.2** | < LOR |
| 12659 | Antimony | mg/kg | 0.01 | **0.04** | **0.89** | **0.64** | **0.92** | **0.05** |
| 12659 | Barium | mg/kg | 0.01 | **0.01** | **0.016** | **0.061** | **0.023** | **0.022** |
| 12659 | Mercury | mg/kg | 0.005 | < LOR | < LOR | < LOR | **0.013** | < LOR |
| 12659 | Lead | mg/kg | 0.005 | < LOR | **2.4** | < LOR | **8.8** | < LOR |

[#] Tobacco samples were prepared for analysis by microwave digestion in nitric acid according to method QIS12659v8 "Determination of Trace Elements in Foods by ICP-MS after Microwave Digestion". This method is applicable to the determination of trace elements (Al, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Mo, Ag, Cd, Sn, Sb, Ba, Hg, Pb) in a wide variety of food samples, including plants.
The resultant digest solution was then analysed by Triple Quadrupole Inductively Coupled - Mass Spectrometer (QQQ ICP-MS) for the aforementioned list of metals using instrument method QIS27441v5 "Determination of Trace Elements in Aqueous Solutions by ICP-MS".
The Inorganic Chemistry laboratory is accredited by NATA as compliant with ISO/IEC17025 (2017) for methods QIS12659v8 and QIS12659v5. Tobacco is dried plant material and therefore aligns to herbs, vegetables and vegetable products which are included in the current scope of accreditation for the Inorganic Chemistry laboratory. Tobacco is therefore covered under the scope of accreditation.

***SSP83249***

## David W

**From:** Suzanne s.73 - Irrelevant information
**Sent:** Wednesday, 17 May 2023 4:09 PM
**To:** David W
**Subject:** Draft Assessment of e-liquid composition
**Attachments:** Draft Assessment of e-liquid composition.docx

Queensland Health

# Assessment of e-liquid composition

**For the Queensland Parliament - Health & Environment Committee**

## 1. Purpose

To assess the chemical composition of e-liquids that are currently in vaping products available in Queensland.

## 2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available in the Queensland vape market.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service).

## 3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risks to users. E-liquids are reported to contain other chemical additives such as flavors, solvents, preservatives and contaminants that may be harmful to health when inhaled as part of vaping.

## 4. Laboratory Analysis

The 17 e-liquid samples were analysed by Queensland Health Forensic and Scientific Services (QH FSS) using the available laboratory methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under the Therapeutic Goods Administration's - Therapeutic Goods (Standard for Nicotine Vaping Products) (TGO 110) Order 2021 (TGO 110), and other substances of concern such as carbonyl compounds, volatile organic compounds (VOCs), pesticides/fungicides/herbicides, and heavy metals.

The detection limit for the analytes was determined by QHFSS based on its current analytical capability. This may vary from the compliance limits established for the substances.

# 5. Results and Discussion

The 17 samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, VOCs, pesticides, and heavy metals, and eight substances that are prohibited ingredients in vapes under the TGO 110.

E-liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose serious health risk to vape users. These chemical additives and contaminants typically include various carbonyl compounds, VOCs, and heavy metals.

The results of the 17 samples are discussed below.

## 5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from trace levels (<200 mg/kg) to 55,000 mg/kg to trace levels.

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml (x mg/kg) of **nicotine**. Vaping products which contain nicotine and are sourced from other retailers are illegal under the *Medicines and Poisons Act 2019*. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

**Commented [SH1]:** Include translation to mg/kg

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user inhalation behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation, nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, and neurodegeneration.

## 4.2 Prohibited ingredients

There are eight chemical compounds listed as prohibited ingredients under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of reporting (LoR) or limit of detention of 2000ppm which is significantly higher (x200) than the compliance limit set under the TGO 110.

Further analysis ~~may~~ would need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should ~~,~~ however, using a different method to assess carbonyls, ~~be noted that~~ benzaldehyde, which is a prohibited ingredient under TGO 110, was detected ~~in the carbonyl analysis~~ in two of the samples, at 28ppm and 66ppm (note 1 mg/kg = 1ppm), which is above the limit set by TGO 110 (<10 ppm).

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110. These include irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

## Table 1 - Nicotine

| Lab Analysis (Limit of Reporting: 200 mg/kg) | IGET Bar Strawberry Watermelon Ice | Vorteke Melon | IGET Bar Strawberry Lemon Ice | IGET Legend Passionfruit Watermelon Ice | IGET Bar Grape Ice | IGET Bar Kiwi Pineapple Ice | IGET Legend Blueberry Blackberry Ice | HQD Cuvie Plus - Strawberry Watermelon | HQD Cuvie Plus – Passionfruit |
|---|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | Present | Present |
| Concentration (mg/kg) | 45,000 | <200 | 54,000 | 52,000 | 49,000 | 55,000 | 47,000 | 38,000 | 44,000 |

| Lab Analysis | IGET Bar - Peach Ice - 3500 puffs | IGET Bar - Blackberry Ice - 3500 puffs | IGET XXL - Lush Ice - 1800 puffs | IGET Goat - Cherry Ice - 5000 puffs | Gunnpod Meta - Gra Ice - 4500 puffs | Gunnpod Wave - Su Breeze - 3500 pu | IGET Mega - Strawberry Banana Ice - 3000 puffs | Waka Smash - Apple surge - 6000 puffs |
|---|---|---|---|---|---|---|---|---|
| Nicotine | Present | Present | Present | Present | Present | Present | Present | |
| Concentration (mg/kg) | 37,000 | 33,000 | <200 | 28,000 | 30,000 | 12,000 | 35,000 | 30,000 |

## Table 2 – Prohibited substances under TGO 110

| Vaping liquid Samples tested (Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg)) | TGO110 - Prohibited Substances | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2,4-Butadione | 2,3-Pentadione | Acetoin | Benzaldehyde | Cinnamaldehyde | Vitamin E acetate | Ethylene glycol | Diethylene glycol |
| IGET Bar Strawberry Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Vorteke Melon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Strawberry Lemon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Passionfruit Watermelon Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Grape Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar Kiwi Pineapple Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Legend Blueberry Blackberry Ice | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus - Strawberry Watermelon | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| HQD Cuvie Plus – Passionfruit | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Peach Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Bar - Blackberry Ice - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET XXL - Lush Ice - 1800 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Goat - Cherry Ice - 5000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Meta - Grape Ice - 4500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Gunnpod Wave - Summer Breeze - 3500 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| IGET Mega - Strawberry Banana Ice - 3000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |
| Waka Smash - Apple surge - 6000 puffs | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR | > LOR |

Assessment of e-liquid composition – Queensland Health

## 5.3 Other Chemicals of Concern

### 5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least two (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

### 5.3.2 Volatile Organic Compounds

VOCs are gases are typically industrial chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VOCs. Five VOCs are common to all 17 samples: propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of e-liquids. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VOCs detected are not known to pose health risks, many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

### 5.3.3 Heavy Metals

All samples contained between five to 15 heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified include lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases, including cancer. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

# 6. Summary of Results

Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to vape users. The analysis identified that:

- All of the 17 samples of e-liquid products analysed contained nicotine. The nicotine content ranged from trace levels (<200 mg/kg) to 55,000 mg/kg.

- None of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit of 2000 ppm. The detection limit employed by QH FSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Using a different analysis method, bBenzaldehyde, which is a prohibited ingredient under TGO 110, was detected through the carbonyl analysis in two of the samples, at 28ppm and 66ppm which is above the limit set by TGO 110 (<10 ppm).
- All 17 samples contained various VOCs. Five (5) VOCs are common to all 17 samples.
- All samples contained between five 5 to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, which were detected in all samples.

## David W

**From:** David W
**Sent:** Wednesday, 17 May 2023 4:51 PM
**To:** Rebecca s.73 - Irrelevant information Suzanne s.73 - Irrelevant information EDHPU
**Cc:** U s.73 - Irrele s.73 - Irrelevant information
**Subject:** FW: H d Environment Committee - testing of smoking products
**Attachments:** Final Draft Assessment of e-liquid composition .docx

Hi Rebecca,

Please find attached a Draft Assessment of e-liquid composition.

As I understand Suzanne Huxley would like another review (tomorrow morning) prior to adding it to the DG brief that you are preparing.

---

**From:** Rebecca s.73 - Irrelevant information .73 - Irrelevant information @health.qld.gov.au>
**Sent:** Thursday, 20 April 2023 9:51 AM
**To:** Karson s.73 - Irrelevant information s.73 - Irrelevant information health.qld.gov.au>
**Cc:** Mark s.73 - Irrelevant s.73 - Irrelevant information health.qld.gov.au>; Mark s.73 - Irrelevant information s.73 - Irrelevant information health.qld.gov.au>; Colleen s.73 - Irrelevant information s.73 - Irrelevant information health.qld.gov.au>; Jim s.73 - Irrelev information health.qld.gov.au>; Elizabeth s.73 - Irrelevant information formation @health.qld.gov.au>
**Subject:** RE: Health and Environment Committee - testing of smoking products

Hello Karson,

Further to this update, we have been asked through CLLO to split the request and undertake some further analysis of vapes provided by the committee. The timeframes are now s.73 - Irrelevant information and vapes related to the vape inquiry mid/late May:

1. s.73 - Irrelevant information **report** by 10am 28 April 2023
2. **E-cigarette report** – including Qld Health and HEC samples by mid/late May 2023 (date to be confirmed)

Given this matter has now neem split can you advise if you prefer our team to progress both, or if your team will progress the s.73 - Irrelevant information report? We can accommodate either option but wanted to ask as you are lead on the Bill and have been progressing the other requests specific to the Bill.

Best Regards
Rebecca

Queensland Government

**Rebecca** s.73 - Irrelevant information
**Advanced Health Promotion Officer**
Prevention Strategy Branch | Queensland Health
Working hours Monday to Friday

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