STRENGTHENING Farming
RIGHT TO FARM

BRITISH COLUMBIA
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FARM NUISANCE ODOUR

Description

Odour is one of the three disturbances specifically mentioned in the *Farm Practices Protection (Right to Farm) Act*. Odour is a result of many farm practices and can be a frequent source of complaint concerning farm activities.

Nature of Odorous Emissions

The term "odour" is used to describe the effect of various substances on the human olfactory system. Odours are generally characterized using the four basic parameters of detectability, quality, intensity, and acceptability.

Detectability

The detectability of an odour is related to its concentration. The concentration at which an odour is first perceived is often referred to as the odour threshold or detection threshold. It is important to note that this value varies from individual to individual, sometimes by as much as two orders of magnitude, due to variations in individual sensitivities. Moreover, other factors such as exposure duration can drastically affect the odour threshold because of olfactory fatigue, and acclimatization.

Odour thresholds are related to detectability and refer to the theoretical minimum concentration of odorous substance necessary for detection in a specified percentage of the population. This percentage is often defined as the mean, 50%, i.e. the lowest odour concentration that can be detected by 50% of the people. Threshold values are not fixed physiological facts or physical constants, but rather, a statistical point representing the best estimate from a tested population. Two types of threshold are evaluated: the detection threshold, which is the lowest concentration at which an odour is detected, with no recognition of the odour quality; and the recognition threshold, which is the minimum concentration that is recognized as having a characteristic odour quality. Typically, the concentration at which an odour is first recognized as having a certain characteristic quality (recognition threshold) is 1.5 to 10 times higher than the detection threshold, depending on the individual and the odorous compound.

Quality

Once the odour is at a sufficiently high concentration to allow recognition, the quality of the odour may be described. The odour quality is a purely subjective descriptor of an odour's aesthetic impression, such as sweet, sour, musty, rancid, etc.

Intensity

The intensity of a given odour is defined as its perceived strength, but is not necessarily related to its concentration. For example, a particularly pungent odour at a very low concentration may be perceived to be more intense than a less pungent substance at a higher concentration.

Acceptability

The odour acceptability, which is also known as the Hedonic tone, is an indication of the pleasantness or unpleasantness of the odour. The acceptability of a particular odour varies with the individual, and may be affected by experience, frequency of occurrence, duration, and odour intensity and character.

It should also be noted that environmental conditions, including temperature and relative humidity have also been found to alter the sensory perception of odours.

Measurement

Human Response to Odours

Human odour perception has particular dependence on individual sensitivity, specificity, and independent processing of olfactory input by the brain.

Human response to odour perception follows certain characteristic patterns that are common among sensory systems. Of some importance is the fact that olfactory acuity (ability) across the population follows a normal distribution. Approximately 96% of the population have a normal sense of smell while 2% are hypersensitive and 2% are insensitive.

Another factor is the portion of the population who are sensitized to a particular odour as a result of repeated exposure. This is distinct from olfactory fatigue or adaptation to odour after prolonged exposure. It should be noted that these terms describe a temporary desensitization after smelling an odour. For example, after exposure to a strong odour an individual may be unable to detect a weaker one.

The response of humans to mixtures of odorous compounds is difficult to predict, since the odour threshold of the mixture is rarely an additive combination of the individual odours. All odours have the ability to mask the odours of other compounds, and odorous constituents may react with each other, changing the odour character or intensity.

Another phenomenon, which may lead to confusion in odour sensing, is the ability of an odour to change character with concentration. For example, carbonyl sulphide has a “burnt” character at concentrations below 1 part per million (ppm), but takes on a “rotten egg” smell at higher concentrations. It is obvious that many of the discrepancies in odour complaints are due in part to this property of odour, in combination with individual variability and geography.

The ability of humans to distinguish different odour intensities is highly subjective. Studies indicate that changes in concentration of the order of 25 to 33% are needed for an individual to recognize a different odour intensity. Human subjects are not very good at making absolute judgements. If they are asked to compare two stimuli they do much better.

There is a wide variation in sensitivity towards odours between individuals and that a factor of 100 between the thresholds of two subjects for the same substance is not uncommon. The sensitivity to odours is specific rather than general, the sensitivity of a person to one odour or group of odours does not predict their sensitivity towards other odours.

Perceived odour quality varies with the individual and also with the strength of an odour. An individual's background will influence their attitude towards odours. A person with a rural background may find an agricultural odour acceptable whereas a person with an urban background may find the same odour offensive. Other psychological factors may influence an individual's perception of an odour. A visual stimulation, for example, may influence an individual's response to an odour stimulus.

Activities to Reduce Complaints

When mitigating odours the following factors should be considered:

- Scale of farm operation/activity (resulting frequency, intensity, duration of odours)
- Type of farm operation/activity (resulting offensiveness of odours)
- Distance to neighbour
- Prevailing wind
- Screening

Agricultural odours typically come from the following sources:

- Livestock farms - livestock buildings or confined livestock areas
  - manure storage or treatment
  - spreading of manure
- Crop farms - rotting vegetation (particularly cole crops)
  - pesticide spraying
  - mushroom media composting

Reducing odour complaints is achieved by keeping the offending odour from reaching the complainant. This is possible by applying one or more of the following five strategies:

1. Changing the odour acceptability, by reducing the unpleasantness of the odour. Examples include:
   - keeping manure aerobic compared to anaerobic;
   - keeping mushroom media compost aerobic; or
   - using a pesticide that does not have an offensive odour.
2. Reducing the amount of odour that is released to the atmosphere. Examples include:
   - storing manure in an enclosed tank;
   - using an injector or sleigh-foot when spreading manure;
   - incorporating rotting vegetation into the soil; or
   - using low volatility pesticides.
3. Reducing the concentration of the odour that reaches the complainant. Examples include:
   - maintaining adequate separation distance from the facility or activity and the complainant to allow the odours to be dispersed before reaching the complainant;
   - having a treed buffer between the facility or activity and the complainant to encourage the odorous air to be diluted with non-odorous air; or
   - spreading manure in the morning when air is rising and odours will be dispersed (compared to evening when air is cooling and settling causing odours to be trapped near the ground).
   - using tall chimneys on ventilation fans from livestock building to allow the odours to be better dispersed.
4. Producing odours when the complainant is not likely to smell them. Examples include:
   - spreading manure when neighbours are not likely to be outside (i.e. not spreading during evening, weekends and holidays); or
   - cleaning out poultry barns when wind blowing away from neighbours that could be impacted.
5. Capturing the odorous air and treat it to reduce the offensive odour. An example would be
   - enclosing a mushroom compost facility and using a scrubber and bio-filter on the air before discharging the air to the atmosphere.

The fifth strategy should only be considered if the first four odour mitigation strategies are not effective.

Legislation

With respect to odour, under the *Farm Practices Protection (Right to Farm) Act*, a farmer is not liable in nuisance to any person for any odour resulting from the farm operation if:

- The farm operation is conducted in accordance with normal farm practices, and
- The farm operation is not conducted in contravention to the *Waste Management Act*.

The Farm Practice Board has ruled that a normal farm practice means the existence of practices showing some threshold of consideration for one's neighbours. They go on to say, it is not proper and accepted practice for farmers to conduct farm operations in such a fashion so as to expose their neighbours to invasive and overwhelming odours, without taking reasonable steps aimed at mitigating those effects.

Waste Management Act

Under the *Waste Management Act*, the release of odours from activities or facilities that cause pollution are prohibited. However, under the *Code of Agricultural Practice for Waste Management*, odours that do not cause pollution are allowed (note in the GVRD the *Waste Management Act* –air emissions requirements are administered by the GVRD).

The question then is when do odours cause pollution? One BC court case gives us guidance on this.

> Air pollution means the presence in the air of any substance (including an odours substance) that causes or is capable of causing material physical discomfort to a person, or substantially alters or impairs the usefulness of the air.

The judge stressed that the physical discomfort must be material; it must have a physiological effect. It is not enough that the odour is unpleasant. The material discomforts in this case included these symptoms: nausea, gagging, coughing, eyes watering, headaches and an aggravation of an existing asthma condition.

Legislation Summary

Odour	Odour mitigation	Waste Management Act	Farm Practices Protection (Right to Farm) Act
Causes pollution	Does not matter	prohibited	does not apply (not protected)
Not polluting, but a nuisance	not in place	allowed	not protected
	in place	allowed	protected
Not polluting, and not a nuisance	not required	allowed	protected

References

Publications that provide information on odour include, but are not limited to, the following (refer to Appendix D for details):

"R. v. Money's Mushroom Ltd. 1997"
"Dorle and Eugene Eason v. Outlander Poultry Farms Ltd. 1999"
"GVRD Air Quality Management Plan Working Paper – Odour Management 1993"