SPIN CYCLE
The Companion Animal Parasite Council recommends fecal examination for adult dogs and cats at least twice per year.
The Veterinary Nurse’s Guide to Fecal Flotation Techniques

**Fecal examination is an important part** of a complete physical examination, and fecal flotation is the most common in-clinic technique used. Fecal flotation is mostly used to identify helminth eggs (e.g., roundworms, hookworms, whipworms), protozoal cysts/oocysts/trophozoites (e.g., *Giardia*, *Toxoplasma*), coccidia, and skin mites (e.g., *Demodex*, *Cheyletiella*).

As more owners take their pets to dog parks, day care facilities, and boarding facilities, the need for complete fecal examination increases. A 2020 study determined that approximately 20% of dogs visiting dog parks are infected with at least 1 intestinal parasite, and 85% of dog parks studied were contaminated with intestinal parasites. Continual environmental contamination poses a real risk. An environment contaminated with parasite eggs is difficult to clean and return to an uncontaminated state. Early detection and treatment of parasite infections potentially reduce environmental contamination and other animal infections.

The Companion Animal Parasite Council (CAPC) recommends performing fecal examinations 2 to 4 times annually, depending on the age of the dog or cat. Diagnosing and treating parasitism help prevent transmitting infection to other pets, help limit the spread of zoonotic disease, and improve overall animal health. There are many ways to examine a fecal sample; this article focuses on the most common and more accurate techniques of fecal flotation.
**Fecal Samples**

Fecal samples should consist of at least 3 to 5 grams of feces in a clean container (*Figure 1*). Acceptable containers include, but are not limited to, an unused sandwich bag, a clean small plastic container, a laboratory-provided sample cup, an examination glove, or common fecal pickup bags. All samples should be labeled with client and patient names, date of sample collection, time of sample collection (depending on suspected parasite and sample storage), age of patient, and any other clinic-specific required information (*Figure 2*).

Ideally, the fecal sample should be fresh (<2 hours old) at the time of examination. Freshly collected samples are less likely to be contaminated with free-living nematodes or pseudoparasites. In fresh samples, the outer membranes of parasite eggs remain intact and the eggs are more likely to be accurately identified. If unable to examine a sample while fresh, store it at 4°C/39°F in the refrigerator. Proper refrigeration will keep most parasite eggs viable for up to 2 months. Samples can be stored indefinitely by adding 10% formalin. However, if not mixed quickly and evenly, formalin can damage some protozoan trophozoites, thereby leading to misdiagnosis by flotation as well as interference with polymerase chain reaction testing.

**Sample Handling**

Some parasite eggs can infect humans (i.e., are zoonotic); therefore, wearing appropriate personal protective equipment (i.e., gloves and goggles) when handling fecal samples is recommended. To avoid contamination, surface areas should be sanitized before and after preparing fecal samples for examination. When performing batches of samples, there should be sufficient space between samples to avoid their contaminating each other. To avoid misidentification, fecal specimens should be labeled during preparation when moving from primary containers to secondary containers or devices, including microscope slides.

**Flotation Solutions**

Many chemical solutions are used for fecal flotation, primarily sugar or salt solutions such as zinc sulfate or sodium nitrate, both of which provide the proper specific gravity so most parasite eggs float to the top and fecal debris stays at the bottom. The range of specific gravity varies because solutions of lower specific gravity are good for retrieval of some eggs and solutions of higher specific gravity are better for others. Appropriate specific gravity also helps keep parasitic...
eggs or protozoan cysts/oocysts intact. To confirm that
the chemical solution specific gravity is in the
acceptable range for your purposes, it should be
checked often, ideally every time you perform fecal
flotations. Many laboratory manuals recommend that
specific gravity for fecal flotation solutions be 1.2 to 1.3.³

**TYPES OF FLOTATION EXAMINATION**

The most common forms of fecal examination are
passive flotation and centrifugation. The main
difference is the mode of separating the fecal debris
from the parasite eggs.

**Passive Flotation**

Passive fecal flotation is the least complicated flotation
 technique. Many disposable and economically priced
kits are available. Compared with the centrifugal
 technique, the number of steps is minimal and less
equipment is required. However, passive flotation is not
as reliable as the centrifugal technique because given
the limited filtering done by disposable kits, the fecal
debris may cover up eggs in the sample.

For passive flotation, a small part of the fecal sample is
placed into the disposable kit container. The chosen
chemical solution is then added, and the sample is
broken down by macerating it gently. After the fecal
matter is thoroughly mixed, additional chemical
solution is added to further dilute the sample. The
container should be filled enough to produce a rounded
meniscus (**FIGURE 3B**), on which a coverslip is placed;
care should be taken not to spill any of the sample. As
stated earlier, provide enough space between mixed
samples to avoid contamination. The sample should
then be left undisturbed with the coverslip in place for
15 to 20 minutes, which allows time for the fecal debris
to sink to the bottom and the eggs to float to the top.
After that time interval has elapsed, the coverslip can be
removed and placed on a microscope slide; this should
be done carefully because the eggs are lightly adhered
to the coverslip. The prepared slide is then ready for
examination under the microscope.

**Centrifugal Flotation**

Centrifugation is the most recommended flotation
technique. It is widely used in clinical settings and at
reference laboratories.⁵ This technique reliably enables
identification of parasite eggs from common domestic
animals and is recommended by the CAPC.

Centrifugation requires more equipment than passive
flotation, including a free arm swinging centrifuge; however, the same chemical solutions can be used.

For centrifugal flotation, the sample is placed in a centrifuge tube with a small amount of chemical solution and is gently macerated and mixed (FIGURE 4). The tube is then placed into the centrifuge and diluted with additional chemical solution until a slightly rounded meniscus is achieved, after which a coverslip is placed so it seals well with the tube. If a batch of multiple samples is not being examined, this tube needs to be balanced to ensure proper rotation; improper balance may damage the centrifuge. Balancing involves using the same type of tube and same type of solution; water is not the best choice because it is lighter than flotation solutions. The sample with coverslip is then centrifuged for 3 to 5 minutes at 1000 to 1500 revolutions per minute, after which the coverslip is moved onto the microscope slide and examined. This technique shortens the time needed to get the parasite eggs to come to the top and the fecal debris to stay at the bottom. It also increases the yield of parasite ova within the sample, thereby increasing the procedure’s sensitivity.

ANTIGEN TESTING
Although this article is about fecal flotation techniques, combining flotation with antigen testing can minimize some of the disadvantages of flotation alone (BOX 1). Antigen tests can detect infections earlier than fecal flotation because they can detect parasites during the prepatent periods, before parasite eggs are present. These enzyme-linked immunosorbent assays detect parasite antigens and identify secretions from adult worms that have not yet released parasite eggs. The CAPC recommends using antigen testing in combination with centrifugal flotation to avoid some of the disadvantages of flotation, to identify common domestic animal parasitic infections earlier, and to differentiate parasite eggs from contaminants.3

CLIENT COMMUNICATION TIPS
When recommending fecal flotation, several published materials can help you educate clients about the importance of fecal examinations, including CAPC guidelines and veterinary websites, such as Veterinary Partner (veterinarypartner.vin.com) and Life Learn Animal Health (lifelearn.com).

- Compare the ease and relatively low cost of routine fecal testing to detect parasitism early with potential costs of treating advanced parasitism later.
- Describe why fecal testing, diagnosis, and treatment (if needed) are beneficial to pets’ health.
- Explain the personal benefits to clients (minimizing zoonotic disease) of diagnosing and treating parasitism in their pets.
- Emphasize the animal and public health value of minimizing parasite burdens in dog parks and other community environments.
- Inform clients that a result of “no parasites seen” does not necessarily mean that their pet is not infected. It means only that eggs were not being passed at that time (e.g., prepatent period) or were not detected (e.g., problem with sample collection, handling, storage, or processing). TVN