

# Fecal Flotation Procedures

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## Flotation solution must have a higher specific gravity than parasite egg or oocysts.

- ◆ Specific gravity refers to weight of object compared to equal volume of water.
- ◆ Specific gravity of water is 1.000 and most parasite eggs are 1.05 - 1.24
- ◆ Flotation solutions should be  $\geq 1.24$

## Specific Gravity of Common Parasite

### Eggs - dogs and cats

◆ <i>Physaloptera sp.</i> (stomach worm)	1.2376
◆ <i>Taenia</i> (tapeworm)	1.2251
◆ <i>Trichuris vulpis</i> (whipworm)	1.1453
◆ <i>Toxocara cati</i> (roundworm-ascarid)	1.1005
◆ <i>Toxocara canis</i> (roundworm-ascarid)	1.0900
◆ <i>Ancylostoma sp.</i> (hookworm)	1.0559

Salt solutions (<1.24) even in a centrifuge may fail to recover *Taenia* and *Physaloptera* due to their heavy specific gravity.

### Flotation Solutions –

- ◆ Sugar: 454g / 355ml water  $\approx 1.27$  sp. gr. (water must be heated to get sugar into solution). add 2ml 37% formaldehyde (10% formalin) – as a preservative
  - **Veterinary Lab Supply:** 315 E. Madison, Winterset, Iowa 50273 USA; Toll-Free (800) 325-3144, FAX (515) 462-9207 [www.veterinarylabsupply.com](http://www.veterinarylabsupply.com)
    - Fecal Flotation Sheather's Sugar, 1 gallon 4/case J1028G
  - **Jorgensen Laboratory** [www.jorvet.com](http://www.jorvet.com)
- ◆ Sheather's Sugar Flotation Solution, J1028G 1 gallon
- ◆ Sodium Chloride: 400g / 1000ml water  $\approx 1.2$  sp. gr.
- ◆ Magnesium sulfate: 400g / 1000ml water  $\approx 1.2$  sp. gr.
- ◆ Zinc sulfate: 371g / 1000ml water  $\approx 1.18 - 1.2$  sp. gr.
- ◆ Sodium nitrate: 400g / 1000ml water  $\approx 1.18 - 1.2$  sp. gr.

### Specific Gravity Hydrometers

- **Fisher** ([www.fishersci.com](http://www.fishersci.com)) **1-800-776-7700**  
–Hydrometer 1.0 – 1.22 sp. gr. Cat# 11-522A
- **Cole – Parmer** ([www.coleparmer.com](http://www.coleparmer.com)) **1-800-323-4340**  
–Ertco<sup>®</sup> Cat # EW-08291-10 1.00 – 1.225 sp. gr.
- **Wards Natural Science** (<http://wardsci.com>) **1- 800-962-2660**  
– Specific Gravity Hydrometer, 1.00–2.00 sp. gr. Cat # 15 V 0887
- **Jorgensen Laboratory** [www.jorvet.com](http://www.jorvet.com)  
– Specific gravity hydrometer 1.18-1.25 J501H

## Lugol's Iodine

- Fisher [www.fishersci.com](http://www.fishersci.com)
- 1-800-776-7700

Lugol's iodine Cat #ES6782, 100ml

With this particular Cat # no mixing is required and can be used straight from the bottle. One drop per slide. If the iodine is too dark dilution may be necessary. Mix 1 part of stock Lugol's iodine to 4 parts of water. Store in dark colored container. It is best to mix only a few ml at one time and make new solution each week as the solution degrades rapidly.

## FUNCTIONAL BENCH TOP CENTRIFUGES

### ❖ Centrifuges - Used

- **IEC Clinical Centrifuge Model CL, with 6 – place swinging bucket rotor. \$250 - \$950**
  - (Older model: not in production, excellent general purpose centrifuge: *make sure when ordering that centrifuge has horizontal rotor and shields*)
  - **search the internet** under Clinical centrifuge or Table/Bench top centrifuge or IEC clinical centrifuge model CL
- **New and used centrifuges can be found at Apexx Equipment, Inc.**
  - 14 Inverness Drive East, Ste. C124, Englewood, CO 80112
  - Ph: (800) 211-0036; Fx: (888) 729-9010
  - [www.apexx-equipment.com](http://www.apexx-equipment.com)

### ❖ New Centrifuges

- **LW Scientific LW-C3 Select Swing-out Select, 8-place, selectable speed centrifuge**
  - Also called Swing-Out Select - catalogue number J501SN
  - Distribution Jorgensen <http://www.jorvet.com/>
- **LW Scientific LW-C5 Select Swing-out Select, 8-place, selectable speed centrifuge**
  - The same as C3 select except digital instead of dials and more expensive.
- **LW Scientific Straight 8-5K Centrifuge**
  - 8-Place swinging head (horizontal) rotor with tube shields and bumpers (4-15mL capacity). Distributor Jorgensen & Apexx
- **Dynac™ II Centrifuge**
  - 8-Place swinging head (horizontal) rotor with tube shields and bumpers
- **UNICO PowerSpin C8606**
  - PowerSpin MX 6-Place Variable Speed Horizontal Centrifuge - 115V
  - Various sources including Webster Veterinary at around approx. \$1,271
    - Note this centrifuge performs best when using plastic tubes provided in the “FPC” system Evergreen Scientific ([www.evergreensci.com](http://www.evergreensci.com))
    - These plastic tubes tops have slight burs that must be filed off before use.
  - Also, Jorgensen -- Polystyrene centrifuge tubes, 15ml, 100-pk J546A
  - <http://www.jorvet.com/store/>
- **Fisher Centrific\* Model 225 Benchtop Centrifuge Cat# 04-978-50**
  - Thermo IEC Six-Place Swinging Bucket Rotor for Fisher Centrific Model 225 Centrifuge 6 x 12mL capacity
  - Shields -- 05-161 IEC No.:303 will need 3 packs of 2.
  - [www.fishersci.com](http://www.fishersci.com)

- ◆ **When ordering any centrifuge always check to see if rotors and shields (metal tubes) are included!!**
- ◆ **Note: a problem occasionally encountered with swing head centrifuges is loss of coverslips during spinning. This can be due to over or under-filling tubes, unbalanced centrifuge rotors, incorrectly sized test tubes or other reasons.**
  - **If this problem is encountered and no obvious solution is found then utilize the fixed head technique (# 2) described on page 3.**

**TEXT:**

Bowman, Dwight D. 2009. Georgis' Parasitology for Veterinarians, 9th Ed. W.B. Saunders, Co., 422 pp.

**Laboratory manuals:**

Foreyt, W.J. 2001. Veterinary Parasitology Reference Manual, 5th Ed., Iowa State University Press.

Veterinary Clinical Parasitology, 7th Edition. Anne M. Zajac, Gary A. Conboy. April 2006, Wiley-Blackwell 320 p

## **FECAL FLOTATION TECHNIQUES**

### **1. Swinging Head Centrifuge**

**Standard Qualitative Fecal:**

1. Weigh out (estimate) 2 or 5 grams of feces.
2. Mix with 10ml of sugar solution.
3. Pour through tea strainer into a beaker/fecal cup.
4. Pour solution from beaker/fecal cup into 12ml or 15ml centrifuge tube. (Depending on the size the centrifuges uses).
5. Place tube into the centrifuge.
6. Fill tube with sugar solution to a slight positive meniscus and cover with a coverslip. There should be a small bubble under the coverslip if correct amount of flotation solution was added.
7. Centrifuge at 1200rpm for 5 minutes. Make sure the centrifuge is balanced.
8. Let stand for 10 minutes.
9. Remove coverslip from tube and place on slide labeled with the animal name or number.
10. Examine entire coverslip at 10X. Use 40X to identify parasites or eggs.
11. Record results.

**Indications:** Most parasite eggs, oocysts, and cysts.

**Limitations:** Fluke eggs and acanthocephalan eggs are too heavy to float. Flotation medium will distort larvae and rupture protozoa trophs.

## 2. Fixed Head Centrifuge

### Standard Qualitative Fecal:

1. Weigh out (estimate) 2 or 5 grams of feces.
2. Mix with 10ml of sugar solution.
3. Pour through tea strainer into a beaker/fecal cup.
4. Pour solution from beaker/fecal cup into 12ml or 15ml centrifuge tube. (Depending on the size the centrifuges uses).
5. Place tube into the centrifuge.
6. Fill tube with sugar solution about 1 inch from the top of the tube. **DO NOT** place a coverslip on the tube.
7. Centrifuge at 1200rpm for 5 minutes. Make sure the centrifuge is balanced.
8. Remove the test tube from the centrifuge and fill to the top with sugar solution.
9. Place a coverslip on the tube. There should be a small bubble under the coverslip if the correct amount of flotation solution was added.
10. Let Stand for 10 minutes.
11. Remove coverslip from tube and place on slide labeled with the animal name or number.
12. Examine entire coverslip at 10X. Use 40X to identify parasites or eggs.
13. Record results.

**Indications:** Most parasite eggs, oocysts, and cysts.

**Limitations:** Fluke eggs and acanthocephalan eggs are too heavy to float. Flotation medium will distort larvae and rupture protozoa trophs.

## 3. Swinging Head Centrifuge – for Giardia

### Standard Qualitative Fecal w/Zinc Sulfate:

1. Weigh out (estimate) 2 or 5 grams of feces.
2. Mix with 10ml of Zinc Sulfate solution.
3. Pour through tea strainer into a beaker/fecal cup.
4. Pour solution from beaker/fecal cup into 12ml or 15ml centrifuge tube. (Depending on the size the centrifuges uses).
5. Place tube into the centrifuge.
6. Fill tube with Zinc Sulfate solution to a slight positive meniscus and cover with a coverslip. There should be a small bubble under the coverslip if correct amount of flotation solution was added.
7. Centrifuge at 1200rpm for 5 minutes. Make sure the centrifuge is balanced.
8. Let stand for 10 minutes.
9. Place 1-2 small drops of lugol's iodine solution on slide.
10. Remove coverslip from tube and place on slide labeled with the animal name or number.
11. Examine entire coverslip at 10X. Use 40X to identify parasites or eggs.
12. Record results.

**Indications:** Most parasite eggs, oocysts, and cysts. **Great procedure for identifying Giardia cysts.**

**Limitations:** Fluke eggs and acanthocephalan eggs are too heavy to float. May not float tapeworms eggs. Flotation medium will distort larvae and rupture protozoa trophs.

**References:**

Zajac A, Johnson J, King S: Evaluation of the Importance of Centrifugation as a Component of Zinc Fecal Flotation Examinations. *J Am An Hosp Assoc* 2002;38(3):221-224.

Dryden MW, Payne PA, Ridley R, Smith V. Comparison of common fecal flotation techniques for the recovery of parasite eggs and oocysts. *Vet Therapeutics* 6(1), 14 – 28, 2005.

Dryden MW, Payne PA, Smith V. Accurate diagnosis of *Giardia* spp. and proper fecal examination procedures. *Vet Therapeutics* 7(1), 4 – 14, 2006.

Dryden MW, Payne PA, Ridley R, Smith V. Gastrointestinal Parasites: the practice guide to accurate diagnosis and treatment. Supplement to Compendium: Continuing Education for Veterinarians. 28 (8A): 3 -13, 2006.

O'Horo M, Comstock A, Hoffmaster L, Hunter A, Jones R, Lloyd R, St. Pierre T: A Comparison of Fecal Examination Techniques for the Recovery of Parasite Ova in Large Animal. *Vet Tech* 2007;July:442-443.