General stool examination

Stool examination is a basic method for getting clues of inflammation, bleeding, obstruction, and parasite infection in gastrointestinal tract and digestive system in clinic. This part of tests includes:

1- Macroscopic examination

2- Microscopic examination

3- Chemical test

4- Microbiologic tests

|  |  |
| --- | --- |
| Component | % of Total Weight |
| Water | 75 |
| Solid | 25 |
| % of Total Solids | |
| Cellulose & Other Indigestive Fiber | Variable |
| Bacteria | 30 |
| Inorganic Material (mostly Ca & PO4) | 15 |
| Fat & Fat Derivatives | 5 |

Composition of Feces on an Average Diet

Macroscopic examination

a. Consistency

Normally, stool is soft and formed, retaining the bowel cast

Abnormal conditions

(1) Dry and hard. This is an indication of constipation and/or dehydration.

(2)  Semi-liquid. These stools are characterized as slowly flowing upon tilting the container. Included in this category are the stools found in diarrhea, dysentery, or following cathartics.

(3)  Liquid. These are diarrheic stools that consist mainly of water. They readily flow upon tilting the box

b. Color

Human feces ordinarily have a light to dark brown coloration, which results from a combination of [bile](http://en.wikipedia.org/wiki/Bile) and [bilirubin](http://en.wikipedia.org/wiki/Bilirubin) that is derived from dead [red blood cells](http://en.wikipedia.org/wiki/Red_blood_cell).

Abnormal conditions

1- Yellow

Yellowing of feces can be caused by an infection known as [Giardiasis](http://en.wikipedia.org/wiki/Giardiasis).

2- Black or red

Feces can be black due to the presence of red blood cells that have been in the intestines long enough to be broken down by digestive enzymes, and is typically due to [bleeding](http://en.wikipedia.org/wiki/Bleeding) in the upper digestive tract, such as from a bleeding [peptic ulcer](http://en.wikipedia.org/wiki/Peptic_ulcer).

3- Green

Feces can be green due to having large amounts of unprocessed bile in the digestive tract.

## c. Odor

Feces possess physiological odor, which can vary according to diet especially the amount of meat protein e.g., [methionine](http://en.wikipedia.org/wiki/Methionine).

Microscopic examination

It is done by preparing and examines slides by the direct wet film and iodine stained procedures, the evaluation of saline direct mounts provides opportunity to study the motility of any trophozoites present.  While the addition of iodine stains the internal structures necessary for identification of the cysts of some amoeba and other protozoa, trophozoites are rapidly killed and are sometimes unidentifiable.  Wet mount procedures should be performed on concentrated specimens.

|  |  |
| --- | --- |
| Microscopic finding | Normal |
| Fat | Colorless, neutral fat (18%)and fatty acid crystals and soaps |
| Undigested food | None to small amount |
| Meat fibers, Starch, Trypsin | None |
| Eggs & segments of parasites | None |
| Yeasts | None |
| Leukocytes | None |

Chemical test

1- pH

Normal value: Neutral to acid or alkaline

Clinical implication

a- Increased pH (alkaline)

1. Protein breakdown

2. Villous adenoma

3. Colitis

4. Antibiotic use

b- Decreased pH (acid)

1. Carbohydrate malabsorptio

2. Fat malabsorption

3. Disaccharidase deficiency

2- Blood

Normal value: Negative

Clinical Implication:

a- Dark red to tarry black indicates a loss of 0.50 to 0.75 ml of blood from the upper GI tract.

b- Positive for occult blood may be caused by

1- Carcinoma of colon

2- Ulcerative colitis

3- Diaphramatic hernia

4- Adenoma

5- Diverticulitis

6- Gastric carcinoma

7- Ulcers

3- Urobilinogen

Normal value :

125 - 400 Ehrlich units / 24 hr

75 – 350 Ehrlich units/100 g

Clinical Implication:

a- Increased values are associated with Hemolytic anemias

b- Decreased values are associated with

1- Complete biliary obstruction

2- Severe liver disease, infectious hepatitis

3- Oral antibiotic therapy that alters intestinal bacteria flora

4- Infants are negative up to 6 months of age

4- Bile

Normal value:

Adults – negative

Children may be positive

Clinical Implication:

a- Bile may be present in diarrheal stools.

b- Increased bile levels occur in Hemolytic anemia

Microbiologic tests

The main pathogens that are commonly looked for in feces include:

* [Bacteroides](http://en.wikipedia.org/wiki/Bacteroides) species
* [Salmonella](http://en.wikipedia.org/wiki/Salmonella) and [Shigella](http://en.wikipedia.org/wiki/Shigella)
* [Yersinia](http://en.wikipedia.org/wiki/Yersinia) tends to be incubated at 30 °C (86 °F), which is cooler than usual
* [Campylobacter](http://en.wikipedia.org/wiki/Campylobacter" \o "Campylobacter) incubated at 42 °C (108 °F), in a special environment
* [Aeromonas](http://en.wikipedia.org/wiki/Aeromonas)
* [Candida](http://en.wikipedia.org/wiki/Candida_%28genus%29) if the person is immunosuppressed (e.g., undergoing cancer treatment)
* [E. coli](http://en.wikipedia.org/wiki/Escherichia_coli_O157:H7)
* [Cryptosporidium](http://en.wikipedia.org/wiki/Cryptosporidium)
* [Entamoeba histolytica](http://en.wikipedia.org/wiki/Entamoeba_histolytica)

[Intestinal parasites](http://en.wikipedia.org/wiki/Intestinal_parasite) and their [ova](http://en.wikipedia.org/wiki/Ovum) (eggs) can sometimes be visible to the [naked eye](http://en.wikipedia.org/wiki/Naked_eye).