

CAPILLARITY

CHROMATOGRAPHY OF A MARKER

WHAT DO YOU NEED:

- MARKER (GREY OR BLACK)
- WATER
- SCISSORS
- TRANSPARENT CUP (PLASTIC OR GLASS)
- ABSORBENT OR FILTER PAPER

TIME: 30 MIN

PROCEDURE:

CUT A STRIP OF PAPER AND DRAW A LINE WITH THE MARKER FEW OF CENTIMETERS FROM THE LOWER EDGE. POUR THE WATER INTO THE BOTTOM OF THE GLASS AND INSERT THE STRIP VERTICALLY: IT IS IMPORTANT TO MAKE SURE THAT THE WATER LEVEL IN THE GLASS IS LOWER THAN THE LINE DRAWN WITH THE MARKER. FOR A SUCCESSFUL EXPERIMENT, IT IS NECESSARY FOR THE WATER TO RISE ALONG THE STRIP OF PAPER BY CAPILLARITY AND REACH THE LINE. REMOVE THE STRIP FROM THE GLASS BEFORE THE WATERFRONT REACHES THE UPPER EDGE. WHAT CAN YOU SEE ON THE STRIP?



SOME MARKERS ARE BLENDS OF COLORED PIGMENTS. WHEN THE WATER RISES BY CAPILLARITY ALONG THE PAPER AND MEETS THE INK, THE WATER TRANSPORTS IT BECAUSE THEIR CHEMICAL SIMILARITY. ALONG ITS PATH, THE INK BREAKS UP INTO A COLORED TRAIL, CALLED A CHROMATOGRAM, WHICH ALLOWS TO OBSERVE THE DIFFERENT PIGMENTS CONTAINED IN THE MARKER THAT MOVE ALONG THE STRIP AT DIFFERENT SPEEDS, BASED ON THE DIFFERENT AFFINITY OF EACH PIGMENT FOR WATER AND FOR SUPPORT. TEST MARKERS OF DIFFERENT COLORS AND OBSERVE THE RESULT.

LET'S PREPARE A pH INDICATOR!

WITH RED CABBAGE

WHAT DO YOU NEED:

- RED CABBAGE
- A POT WITH WATER
- BURNER
- SIEVE
- ACID AND BASIC SUBSTANCES (AS LEMON, SODIUM BICARBONATE, DEGREASER, VINEGAR)
- TRANSPARENT CUPS (PLASTIC OR GLASS)

TIME: 2 ORE

STEP 1: PREPARE THE INDICATOR

CUT THE RED CABBAGE INTO SMALL PIECES AND PUT IT IN A POT WITH 2 LITERS OF WATER. BOIL IT FOR 15 MINUTES AND LET COOL. ONCE COOLED DOWN, FILTER THE LIQUID OBTAINED: THE INDICATOR IS READY TO BE TESTED! IN THE ABSENCE OF RED CABBAGE, CRANBERRY JUICE, KARKADÈ OR ROSEHIP INFUSION CAN BE USED AS WELL.

STEP 2: NOW TEST THE INDICATOR!

POUR THE INDICATOR INTO GLASSES AS MANY AS THE SUBSTANCES YOU WILL TEST TO MEASURE PH: THEN ADD THE SUBSTANCE TO THE INDICATOR SOLUTION AND OBSERVE WHAT HAPPENS. COMPARE THE COLOR OF THE SOLUTION AFTER ADDITION WITH THE SCALE BELOW TO FIND OUT THE PH OF THE TESTED SUBSTANCE. WHICH ONE IS AN ACID, AND WHICH ONE IS A BASE?



THE LUMINESCENCE OF HIGHLIGHTER

WHAT DO YOU NEED:

- SMARTPHONE
- TRANSPARENT SCOTCH TAPE
- BLUE MARKER
- HIGHLIGHTERS

TIME: 30 MIN

STEP 1: PREPARATION OF THE SMARTPHONE FLASH FILTER

APPLY A PIECE OF SCOTCH TAPE OVER THE SMARTPHONE CAMERA FLASH AND DARKEN IT WITH THE BLUE MARKER; APPLY A SECOND PIECE OF SCOTCH TAPE OVER THE PREVIOUS ONE, AND AGAIN DARKEN IT WITH THE MARKER. TO OBTAIN A BETTER FILTER, ANOTHER LAYER OF SCOTCH TAPE CAN BE APPLIED.



STEP 2: LET'S SEE THE LUMINESCENCE PHENOMENON!

WRITE WITH DIFFERENT HIGHLIGHTERS ON A WHITE SHEET OF PAPER AND DARKEN THE ROOM; ILLUMINATE THE PAPER USING THE SMARTPHONE FLASHLIGHT WITH THE SCOTCH TAPE FILTER. WHAT CAN YOU SEE?

