

# *Organic Compounds in Daily Life*

*Chem 241, Fall 2012*

# Organic Compounds in Daily Life

**Orajel** (Benzocaine)

Active Ingredient:  
CCOC(=O)c1ccc(N)cc1  
 = Benzocaine (20%)  
 Oral Pain Reliever

**Ibuprofen PM** (Ibuprofen)

Active ingredient:  
CC(C)C(O)C(=O)c1ccc(cc1)C(C)C  
 (R,S)-2-(4-(2-methylpropyl)phenyl)propanoic acid  
 Pain reliever

**Tylenol** (Acetaminophen)

Active Ingredient:  
CC(=O)Nc1ccc(O)cc1  
 = Acetaminophen (325mg)  
 Pain Reliever / Fever Reducer

**Tylenol** (Acetaminophen)

Tylenol  
 Acetaminophen  
 analgesic  
CC(=O)Nc1ccc(O)cc1

## Pharmaceuticals, Pain Relievers

# Organic Compounds in Daily Life

**Bena-dryl**  
Active ingredient: Diphenhydramine HCl

CN(C)CCOC(c1ccccc1)c2ccccc2

Antihistamine

**Active Ingredient:**  
• HCl  
: diphenhydramine hydrochloride

CN(C)CCOC(c1ccccc1)c2ccccc2

antihistamine, sleep-aid/sedative

**Active Ingredient**  
Cetirizine Hydrochloride - 10 mg

Clc1ccc(cc1)N2CCN(CC2)CCOC(=O)O

antihistamine, allergy medicine

**Active Ingredient:**  
= cetirizine hydrochloride  
allergy medication

Clc1ccc(cc1)N2CCN(CC2)CCOC(=O)O

**Active Ingredient:**  
Loratadine

CCOC(=O)c1ccc(cc1)-c2ccc(cc2)Cl

antihistamine, allergy relief

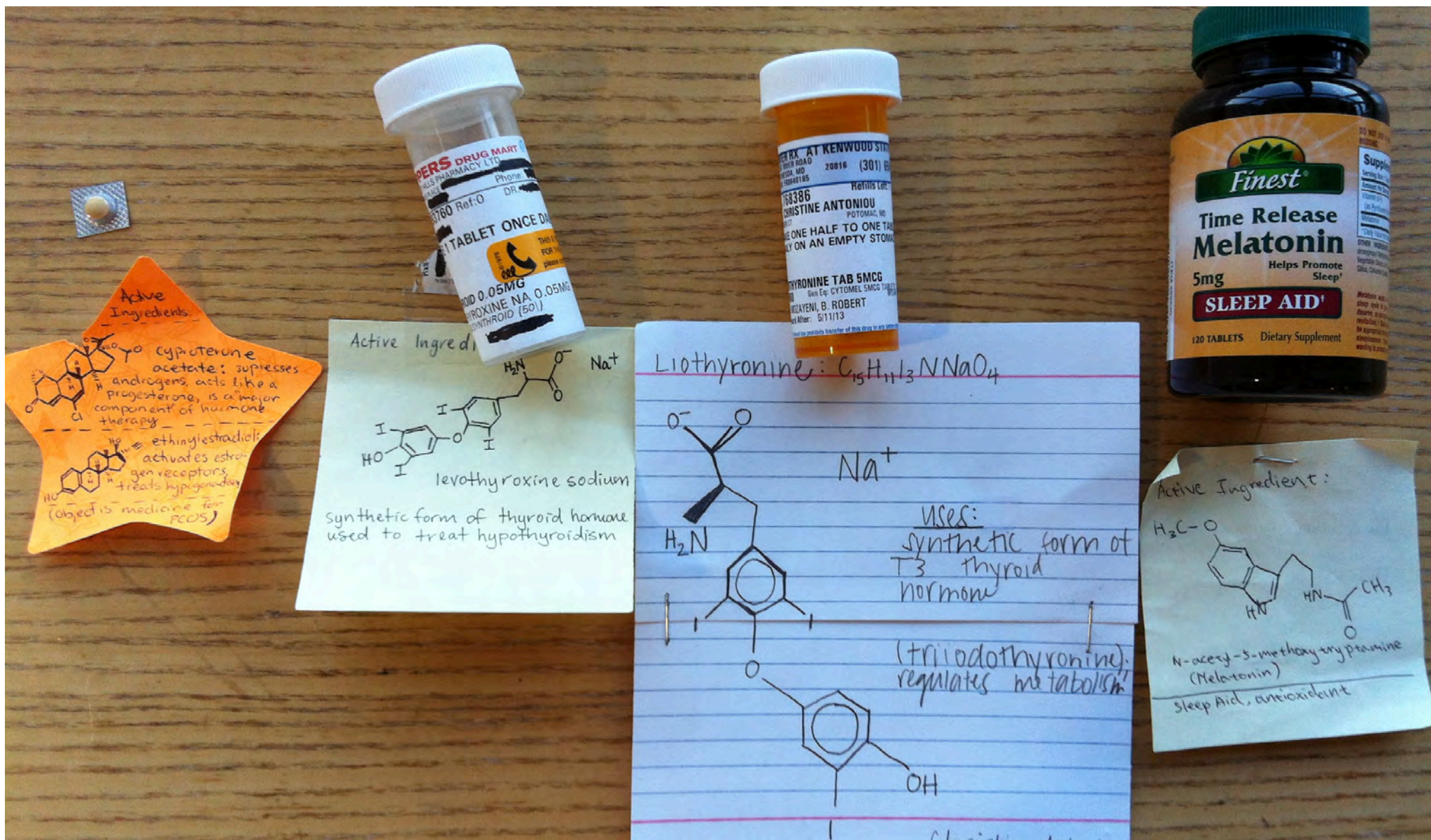
**Active Ingredient: (Allegra)**  
Fexofenadine HCl

CC(=O)Oc1ccc(cc1)C2=CC=C(C=C2)C3=CC=C(C=C3)O

- histamine H<sub>1</sub>-receptor antagonist, relieves seasonal allergy symptoms

## Pharmaceuticals, Anti-Allergens

# Organic Compounds in Daily Life



**Active Ingredients**

**Cyproterone acetate:** suppresses androgens, acts like a progesterone, is a major component of hormone therapy

**Ethinylestradiol:** activates estrogen receptors, treats hypogonadism (object is medicine for PCOS)

**Active Ingredient:**

**levothyroxine sodium**

Synthetic form of thyroid hormone used to treat hypothyroidism

**Liothyronine:**  $C_{15}H_{11}N_3NaO_4$

**USES:** synthetic form of T3 thyroid hormone (triiodothyronine) regulates metabolism

**Active Ingredient:**

**N-acetyl-5-methoxytryptamine (Melatonin)**

Sleep Aid, antioxidant

# Organic Compounds in Daily Life

**Equaline**  
compare to Imodium® A-D active ingredient  
NDC 41163-375-02  
loperamide hydrochloride tablets, 2 mg  
**anti-diarrheal tablets**  
controls the symptoms of diarrhea  
12 caplets\*  
each caplet (capsule-shaped tablet) contains 2 mg loperamide hydrochloride

**Ricola**

**decongestant vapor inhaler**  
levmetamfetamine nasal decongestant  
relief from nasal congestion of:  
• colds • allergies • hay fever • sinusitis  
NET WT .007 OZ (198mg)

**Famotidine**  
inhibit stomach acid production (acid reducer)

**azithromycin tablets**  
NDC 59762-3060-1  
1 Card x 6 Tablets  
GREENSTONE® BRAND  
**250 mg\***  
Rx only

**Handwritten Notes:**

- Loferamide Hydrochloride (2 mg/capsule)**  
Anti-diarrheal
- Active Ingredient: Menthol (4.8 mg)**  
(1R,2S,5R)-2-isopropyl-5-methylcyclohexanol  
Cough Suppressant
- NASAL DECONGESTANT**  
organic ingredients: Levmetamfetamine  
menthol:  $C_{10}H_{20}O$
- Active Ingredient: azithromycin**  
Use: antibiotic to treat/prevent bacterial infection

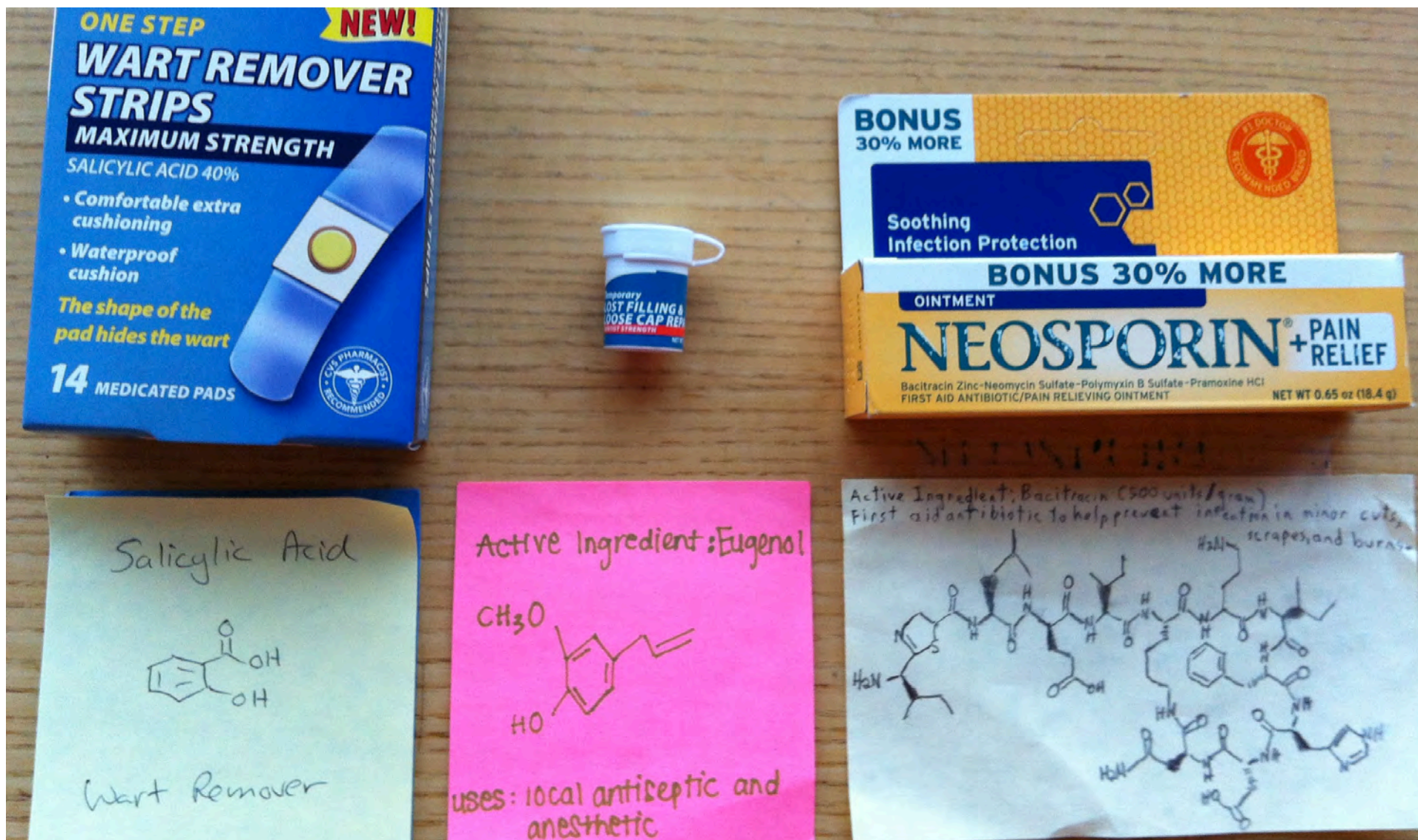
Pharmaceuticals, Other Oral/Inhalant

# Organic Compounds in Daily Life



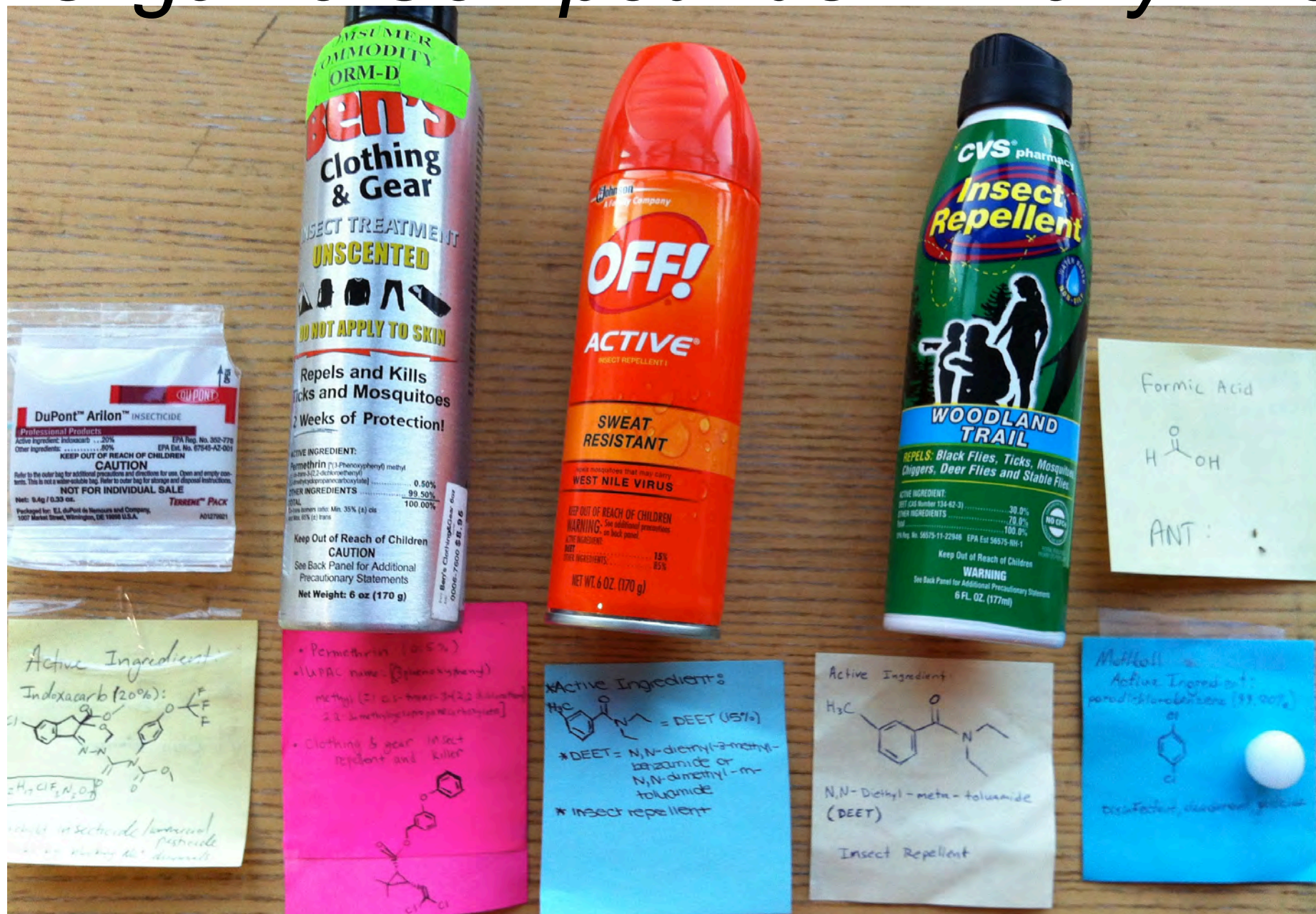
Pharmaceuticals, Topical Steroids and Antifungals

# Organic Compounds in Daily Life



Pharmaceuticals, Topical Other

# Organic Compounds in Daily Life



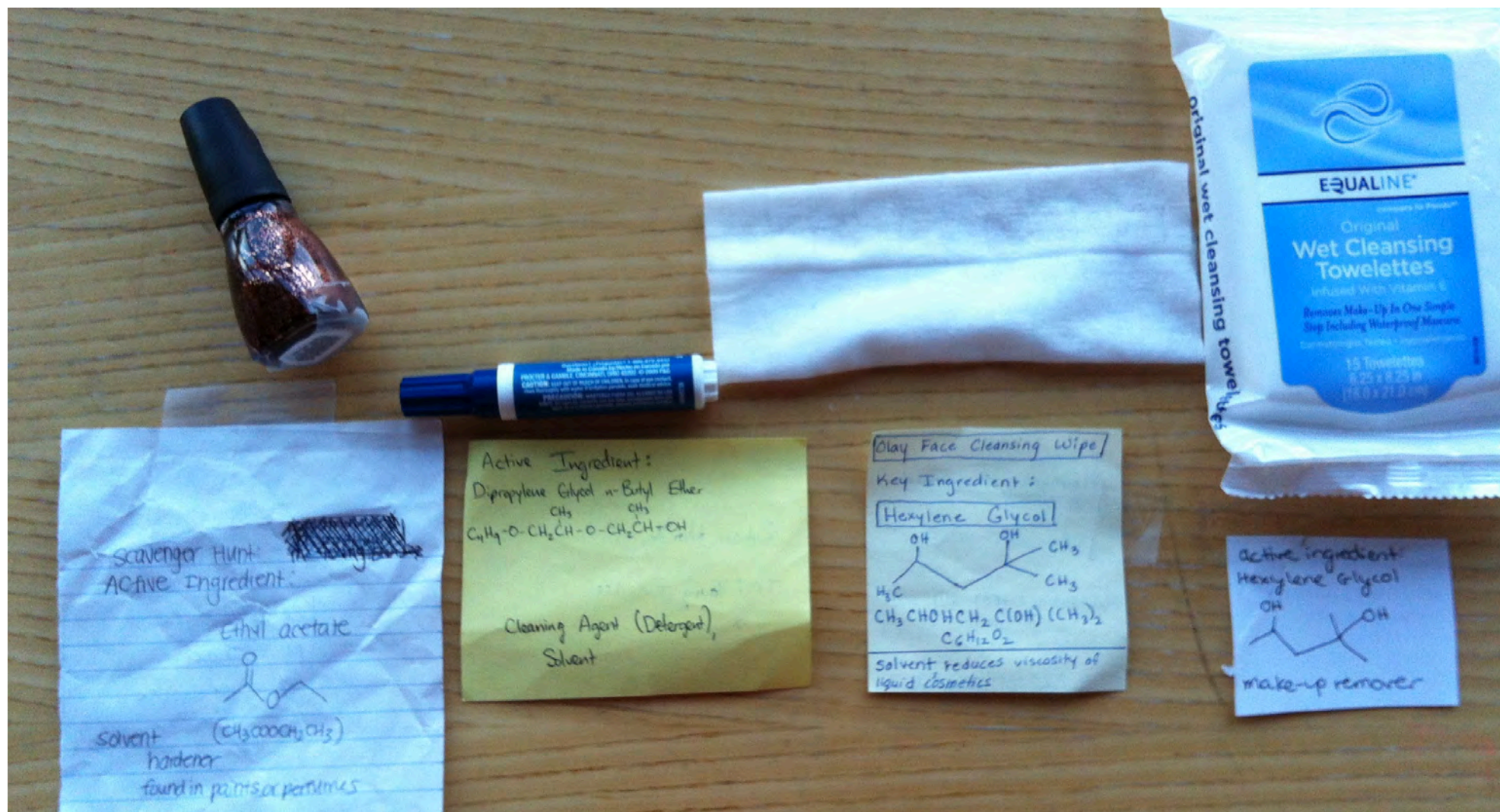


# Organic Compounds in Daily Life



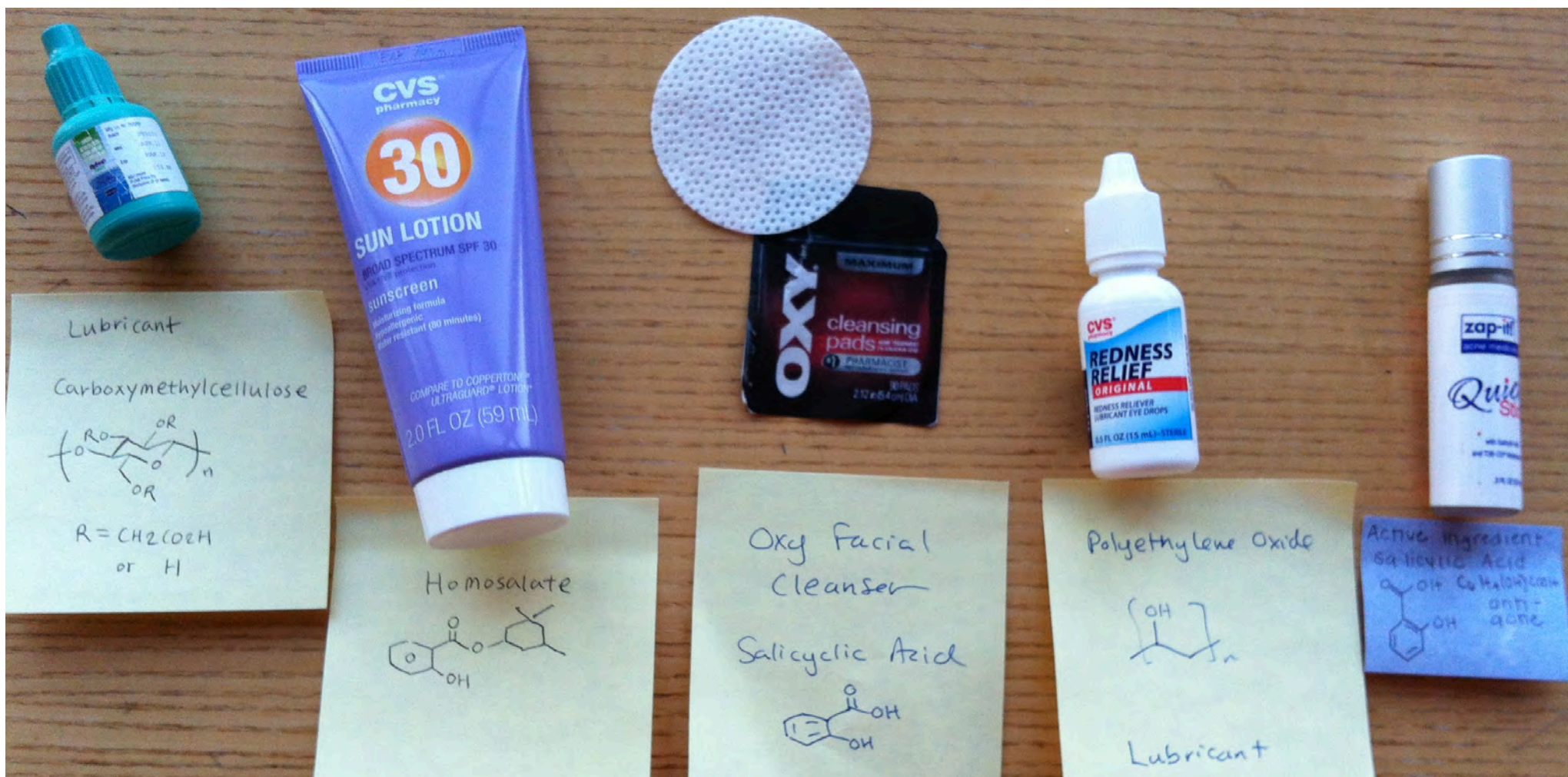
*Insecticides, cont.*

# Organic Compounds in Daily Life



## Personal Care, Solvents

# Organic Compounds in Daily Life



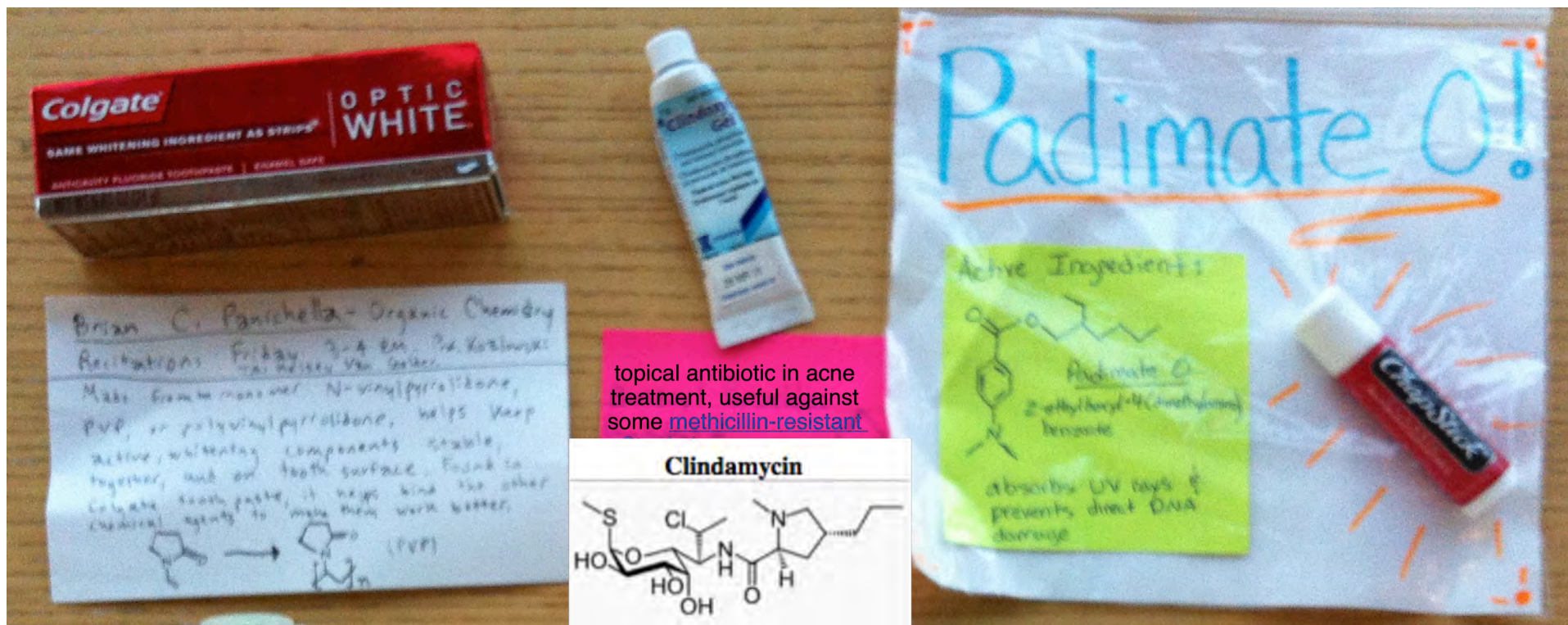
*Personal Care, Lubricants and Salicylates*

# Organic Compounds in Daily Life



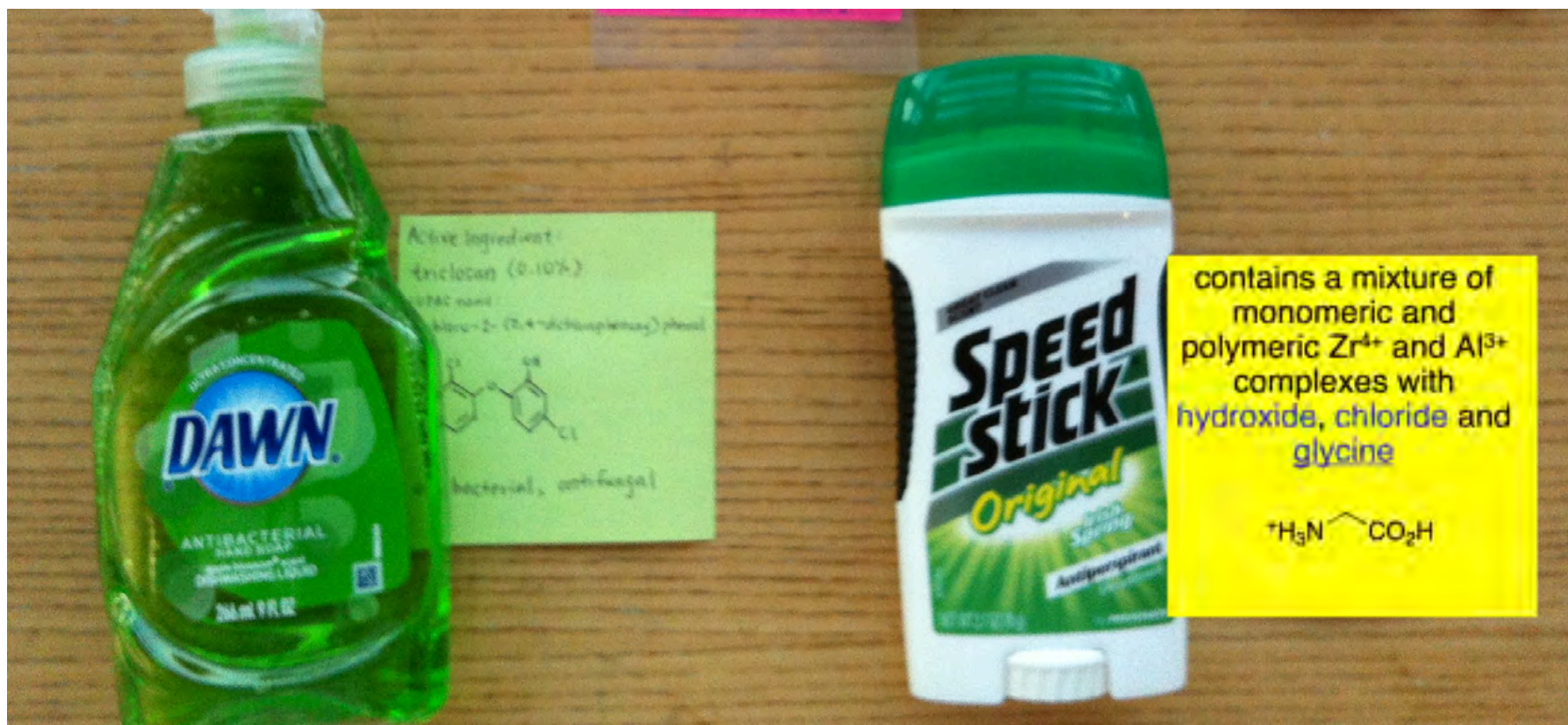
## Personal Care, Surfactants/Solubilizers

# Organic Compounds in Daily Life



## Personal Care, Surfactants/Solubilizers

# Organic Compounds in Daily Life



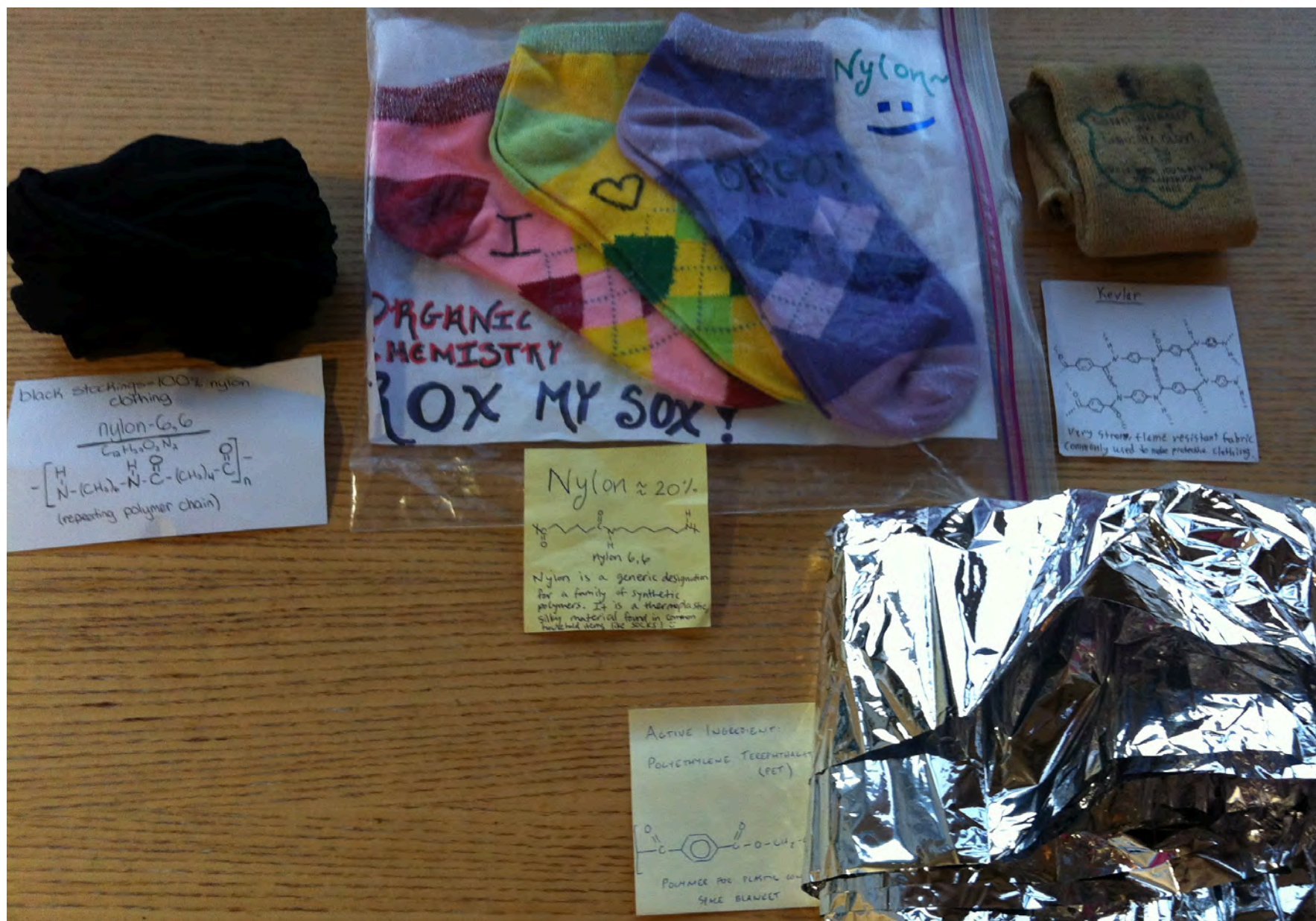
*Personal Care, Surfactants/Solubilizers*

# Organic Compounds in Daily Life



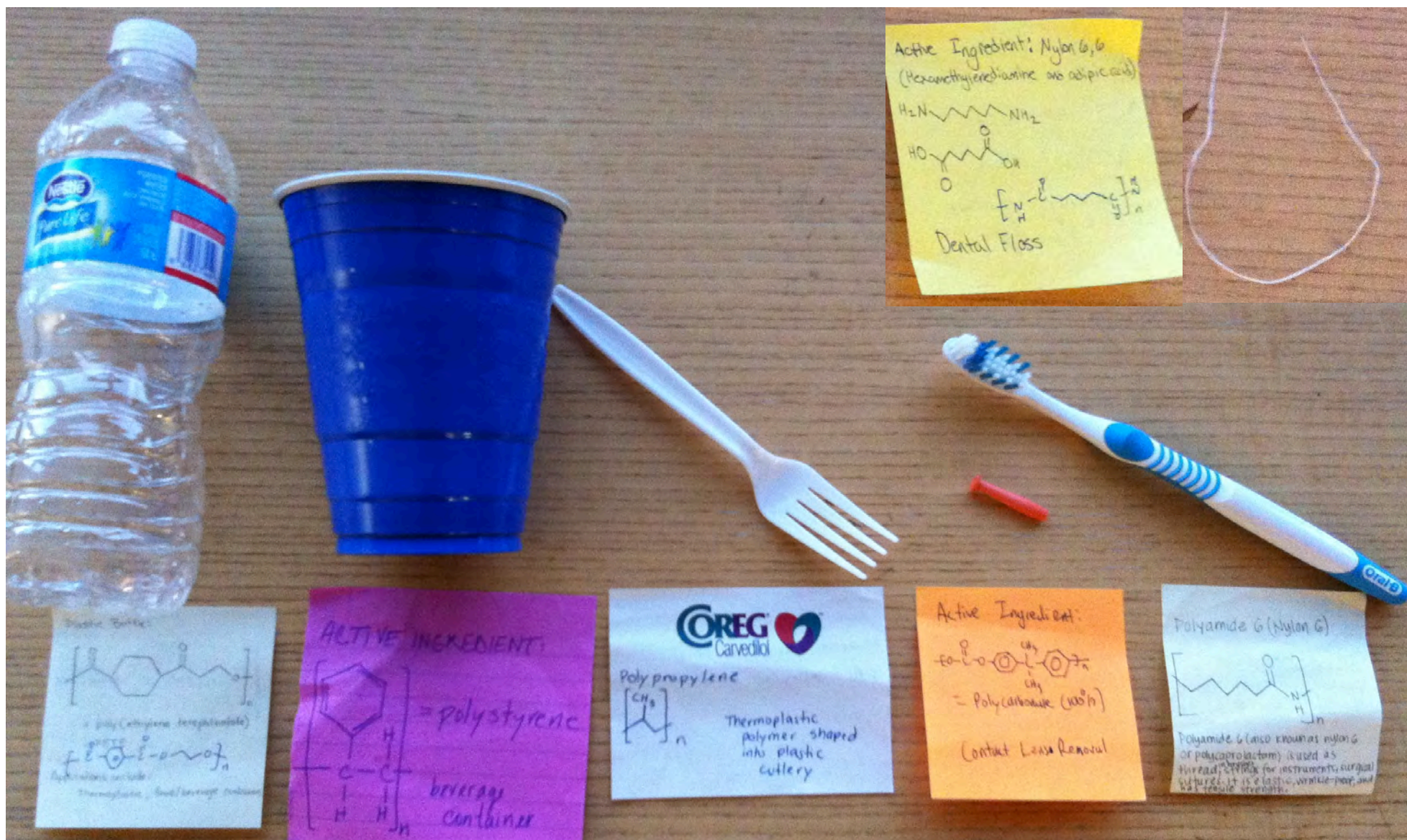
## Polymers, Sports

# Organic Compounds in Daily Life





# Organic Compounds in Daily Life



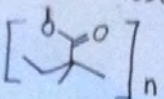
*Polymers, Disposable but not biodegradable...*

# Organic Compounds in Daily Life

Serena Machi  
TA: Kelsey van Gelder

Item: Acrylic Glass/Poly(methyl methacrylate)

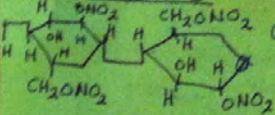
Molecular Formula:  $(C_5O_2H_8)_n$

Structure: 

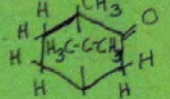
Description: I laser cut this small key chain. The material is a transparent thermoplastic and a synthetic polymer of methyl methacrylate.

Main component: Celluloid  
Celluloid consists of:

Cellulose nitrate

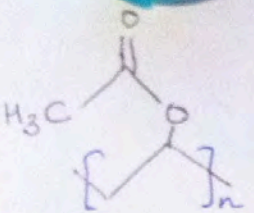
 check structure

Camphor plasticizer



Used for plucking strings to produce a sharp sound

Poly(methyl methacrylate)

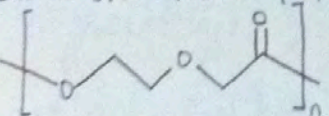


USE: Adhesive




Suture

General structure of polymer:

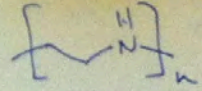


Repeating ether-ester units

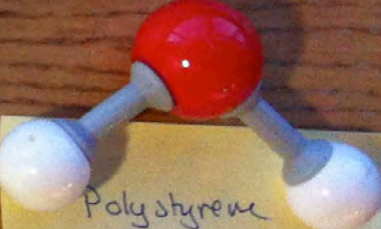
- Used for soft-tissue approximation
- Wound support for ~6wks.



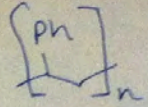
Polyethylene amine



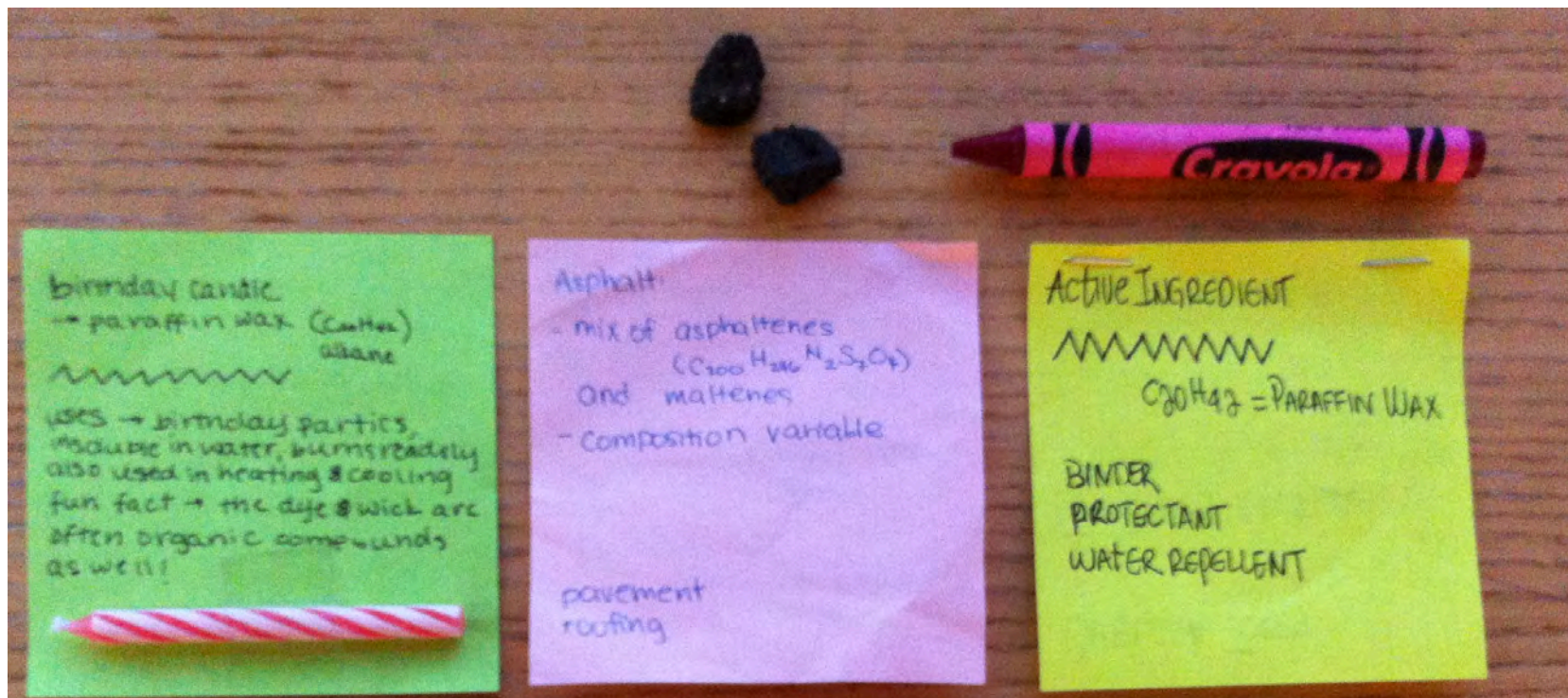
useful in gels  
here, a cleaning agent



Polystyrene



# Organic Compounds in Daily Life



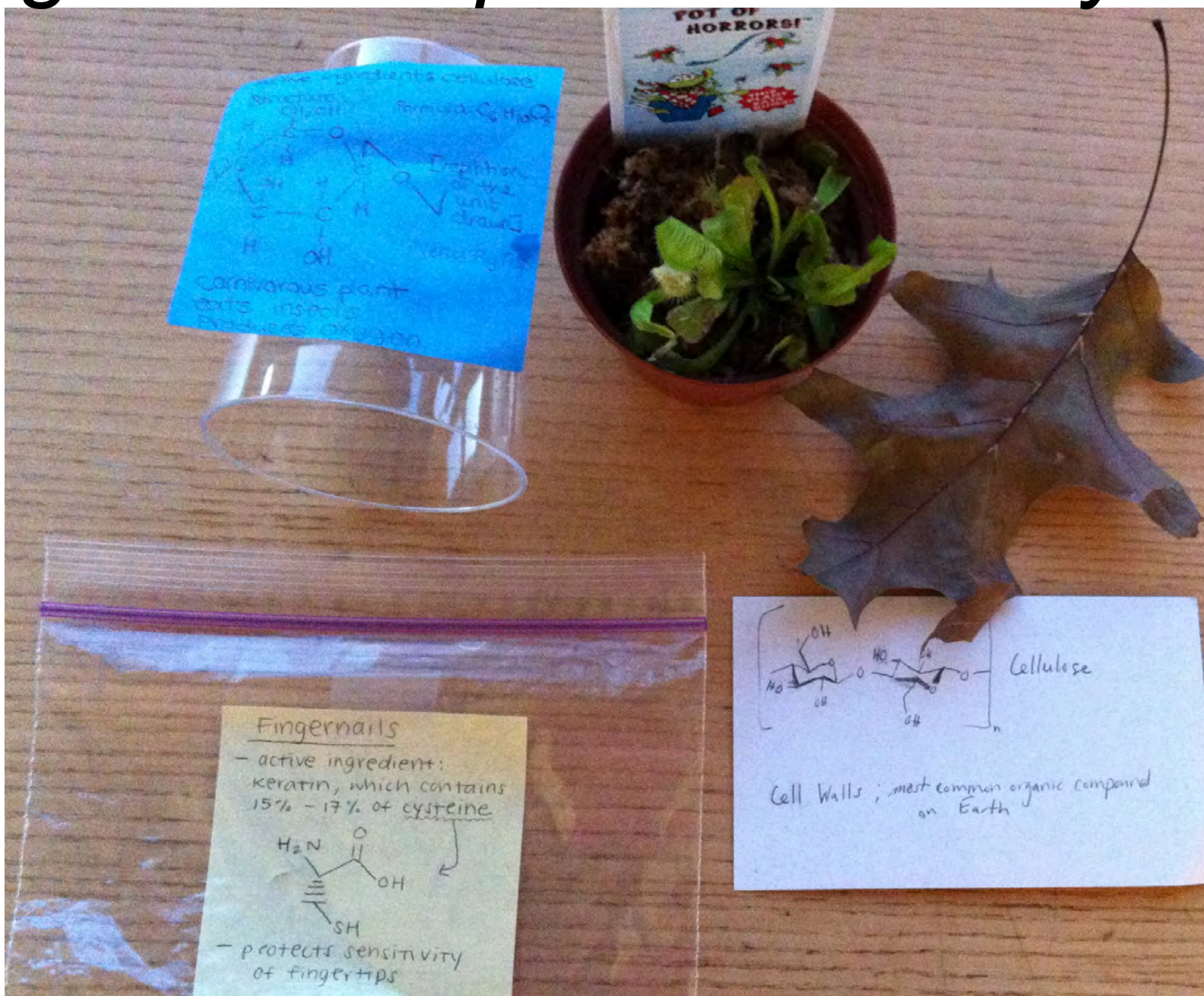
*Polymers, Polyalkane*

# Organic Compounds in Daily Life

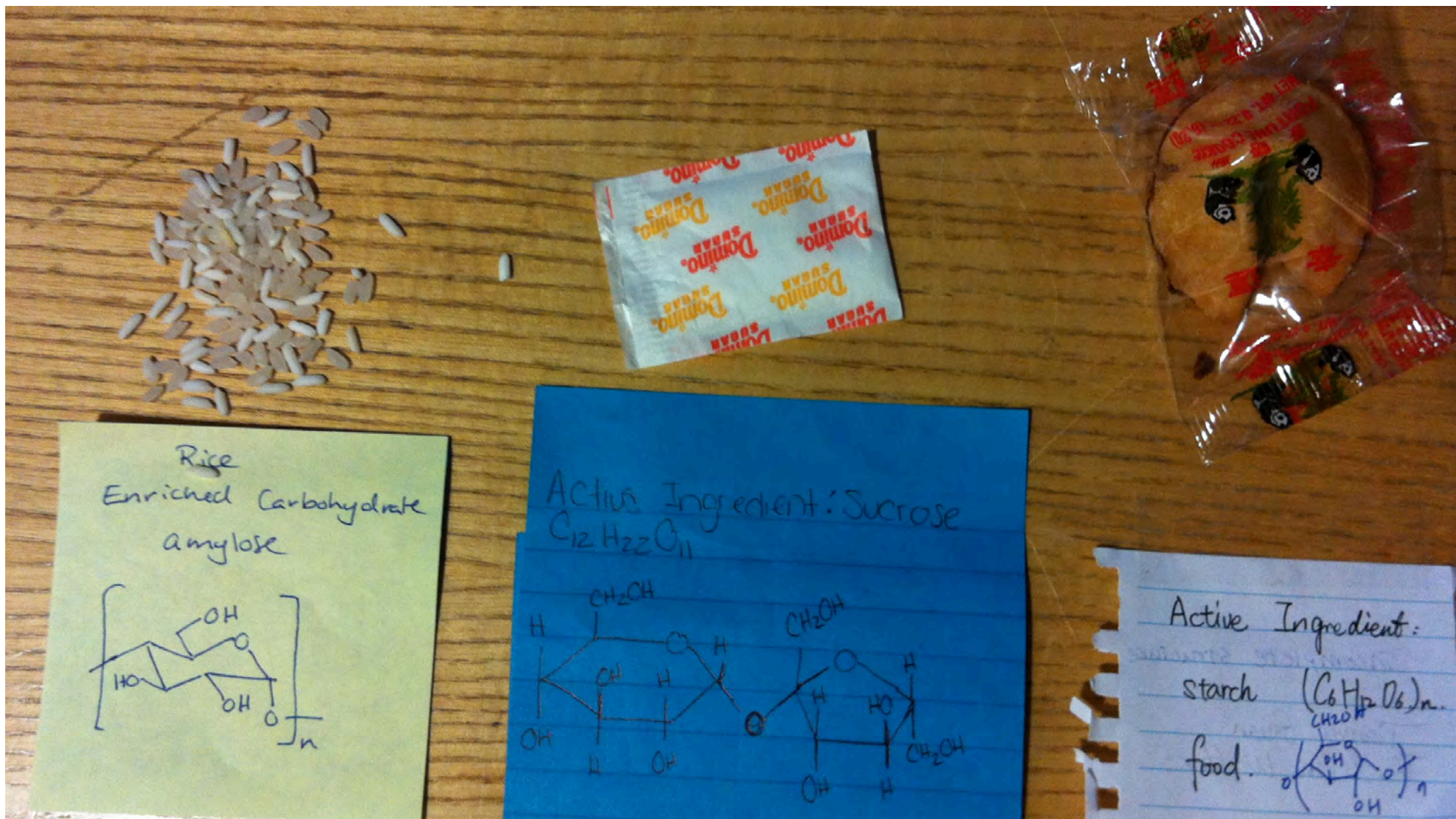


*Polymers, Polyalkane cont.*

# Organic Compounds in Daily Life

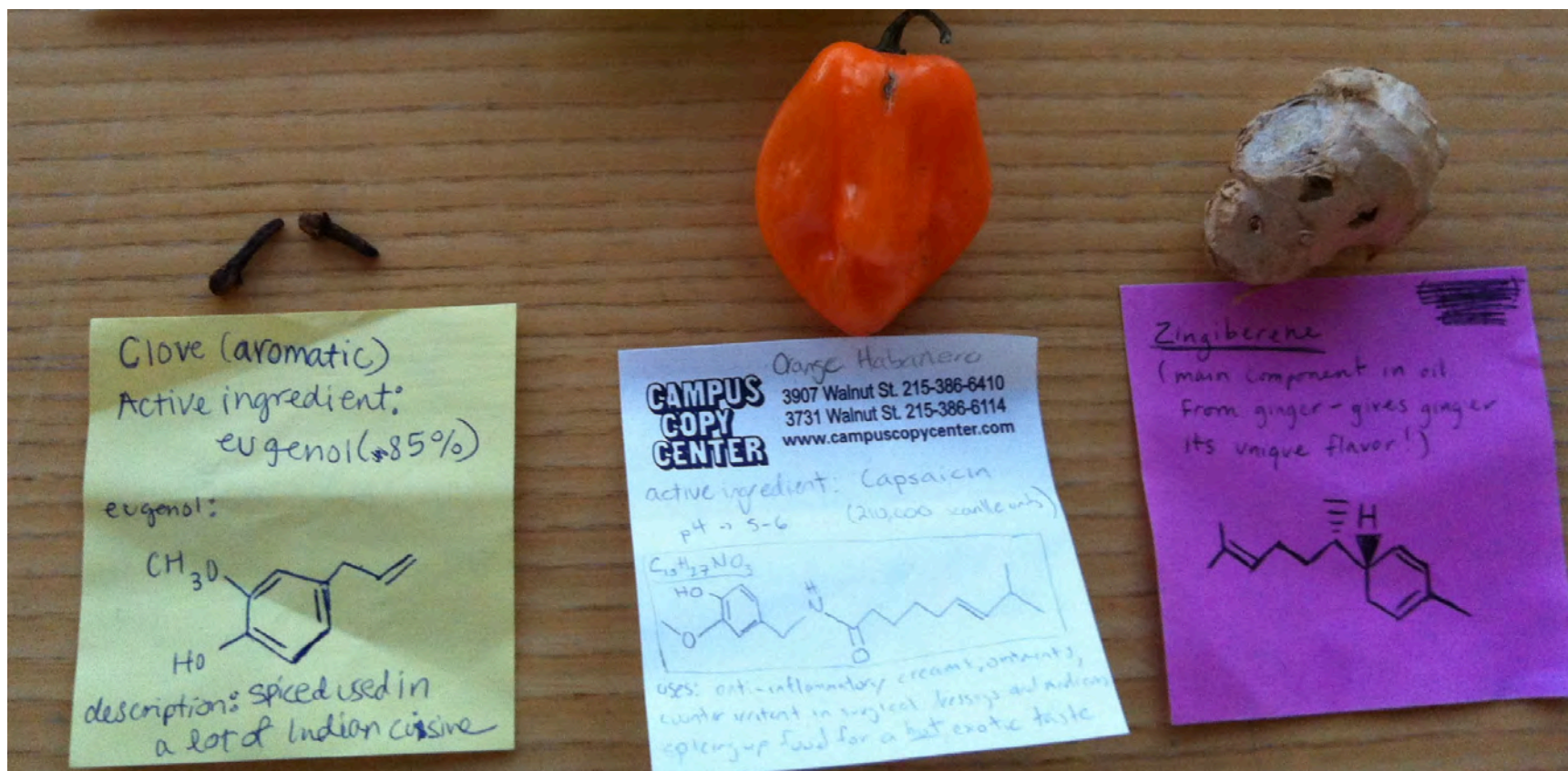


# Organic Compounds in Daily Life



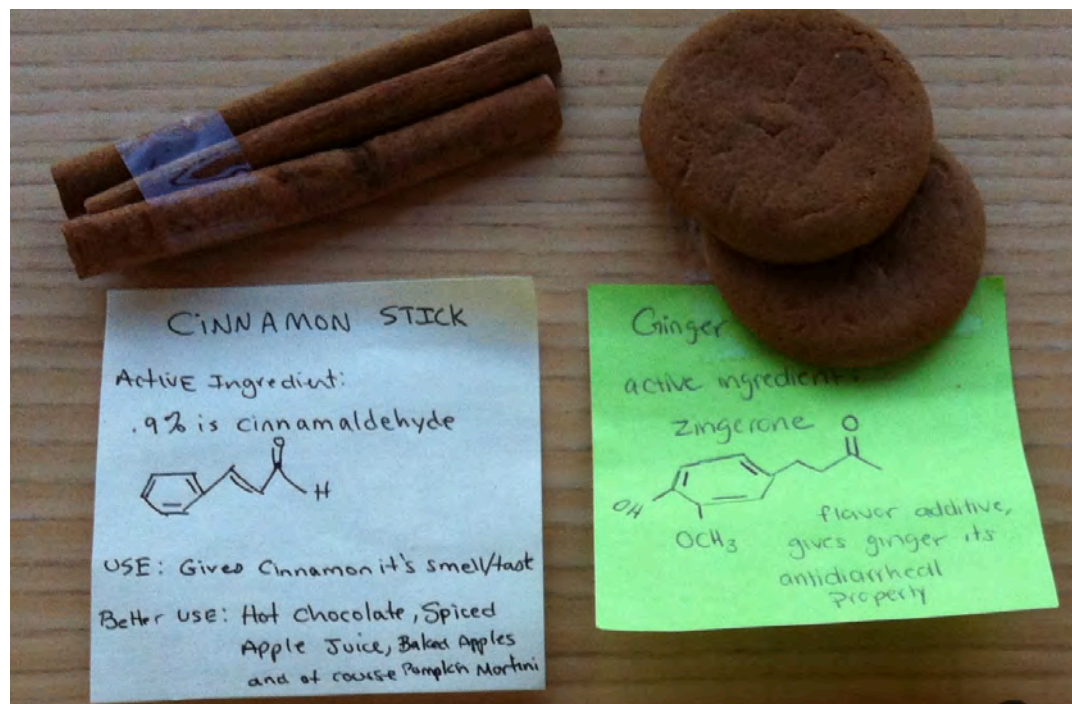
Food, Energy Sources

# Organic Compounds in Daily Life



## Food, Flavorings

# Organic Compounds in Daily Life



*Food, Flavorings cont.*



# Organic Compounds in Daily Life

**Theobromine**  
 • The most active organic ingredient in chocolate  
 • Cocoa bean is richest and concentrated source of theobromine  
 • It is an alkaloid that serves as a mild stimulant and has slight diuretic properties  
 Content in chocolate: 5-10g/kg  
 Interesting fact: Theobromine is what makes chocolate toxic to dogs - only metabolized in more than 10 hours!

CN1C=NC2=C1C(=O)N(C)C2=O  $C_7H_8N_4O_2$

**Chocolate** 9/10/12 dr@11m  
 Active Ingredient:  
 Theobromine aka xanthose  
CN1C=NC2=C1C(=O)N(C)C2=O  $C_7H_8N_4O_2$   
 • bitter tasting alkaloid found in the cacao plant  
 • acts similarly to caffeine

**Milk + White: Milk Chocolate Truffles**

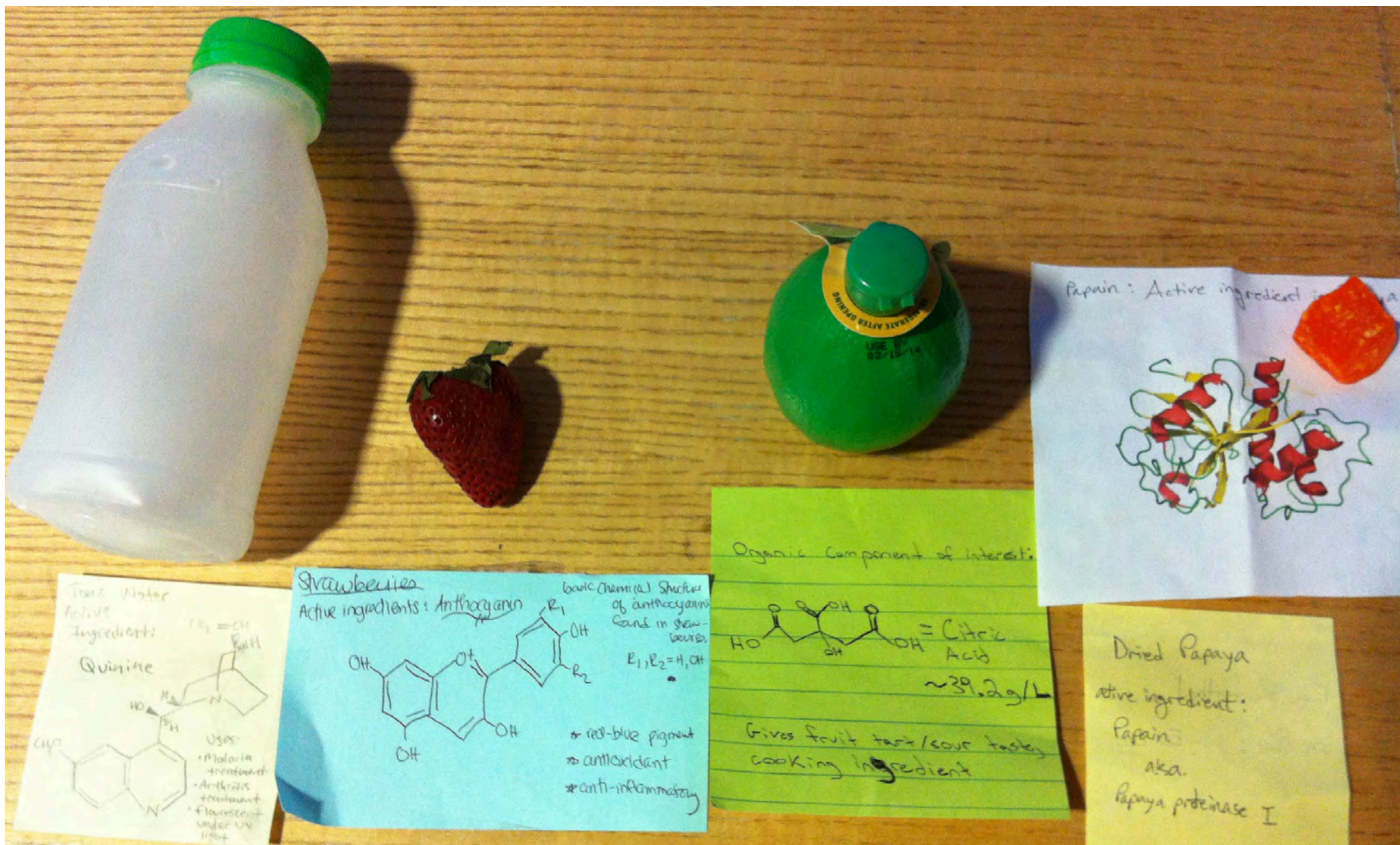
① Caffeine - <sup>chocolate</sup> ingredient  
 $C_8H_{10}N_4O_2$   
CN1C=NC2=C1C(=O)N(C)C2=O

② Vanillin  
 $C_8H_8O_3$   
COc1ccc(O)c(C=O)c1  
 \* If only checking one structure, check vanillin.

③ Theobromine from cocoa butter ingredient  
 $C_7H_8N_4O_2$   
CN1C=NC2=C1C(=O)N(C)C2=O

Food, Chocolate mmm...

# Organic Compounds in Daily Life



# Organic Compounds in Daily Life

The image shows two boxes of candy: Orbit (left) and BreathSavers (right). Below them are two sticky notes with handwritten chemical structures and their uses.

**Left sticky note (blue):**

Sorbitol (or glucitol)

OC(CO)C(O)C(O)CO

sweetener  
laxative  
humectant  
thickener

**Right sticky note (yellow):**

Active Ingredients

OC(CO)C(O)C(O)CO = SORBITOL

CCCCCCCCCCCCCCCC(=O)O[Mg+2]OC(=O)CCCCCCCCCCCCCCCC = MAGNESIUM STEARATE

CC(=O)N[C@@H](C(=O)N)C[C@@H](OC)C(=O)N = ASPARTAME

# Organic Compounds in Daily Life

**Fish Oil**

Active Ingredient: Omega 3 Fatty Acids

Linoleic Acid

CCCC=CCCCCCCCCCCC(=O)O

Alpha-Linolenic Acid

15, 16, 14 # carbons have 1 H atom instead of 2 in addition to the above structure.

Contains:

Biotin (30 µg/tablet)

CCCCCCCCCCCCCCCC(=O)N1CNC(=O)NC1=O

Biotin is a coenzyme for carboxylase enzymes, synthesis of fatty acids, metabolism of fats and amino acids.

**pyridoxine (hydrochloride)**

Cc1cc(O)c(O)c(O)c1[N+]([O-])Cl

Uses: Vitamin, boost immunity, assist in making amino acids, produce neurotransmitters, metabolism energy.

Ingredient: Stearic Acid

CCCCCCCCCCCCCCCC(=O)O

B-12 vitamin, dietary supplement

Taurine

CC(N)S(=O)(=O)O

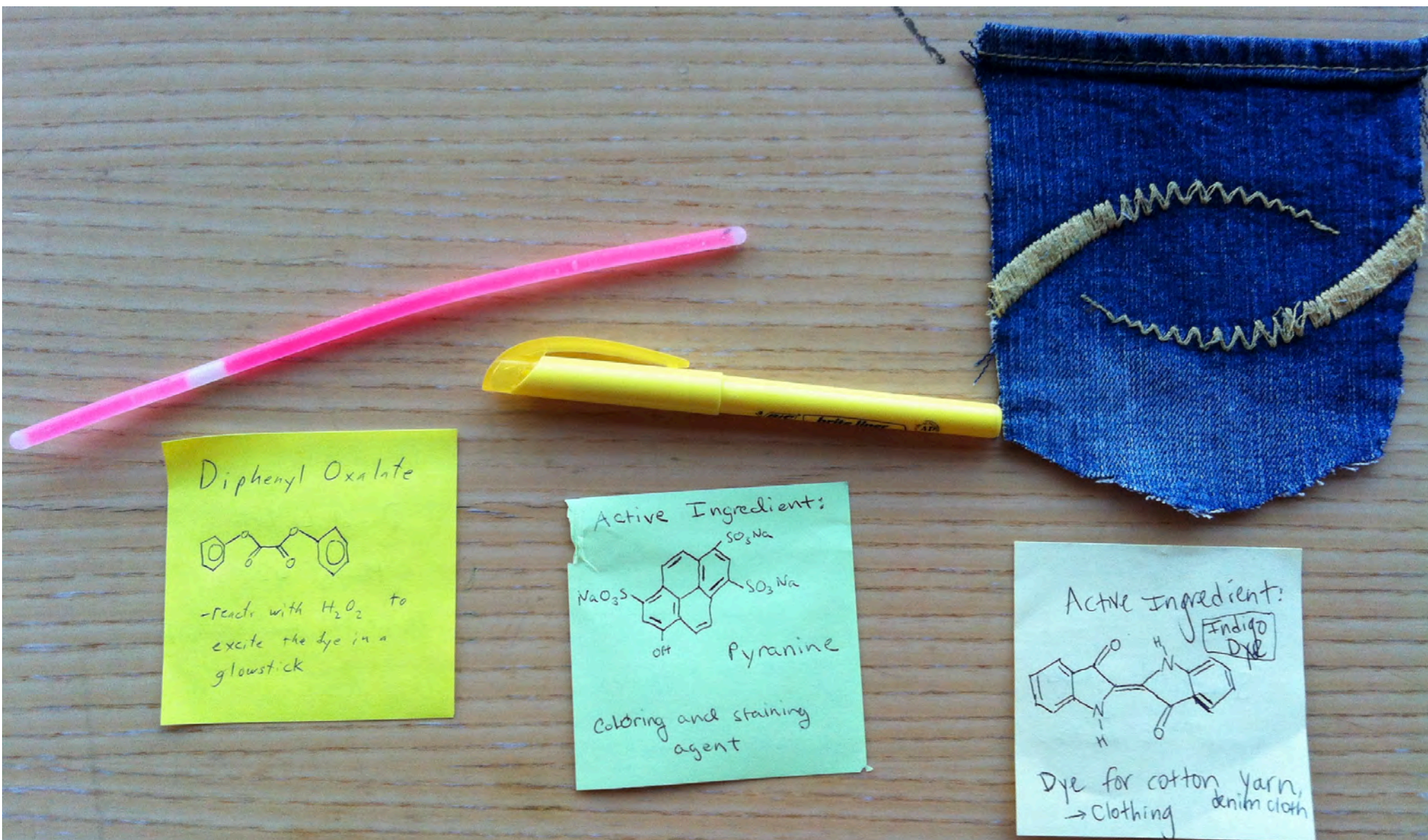
Conjugation of bile acids, antioxidation, osmoregulation, membrane stabilization, & modulation of calcium signaling.

active ingredients: Vitamin B12

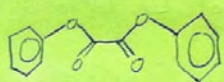
see attached paper for structure

plays a key role in the normal functioning of the brain and nervous system

# Organic Compounds in Daily Life

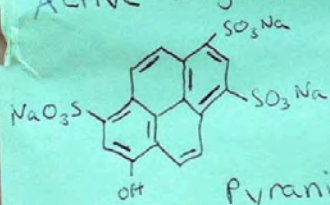


Diphenyl Oxalate



-reacts with  $H_2O_2$  to  
excite the dye in a  
glowstick

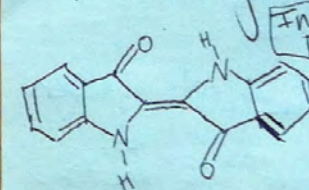
Active Ingredient:



Pyranine

Coloring and staining  
agent

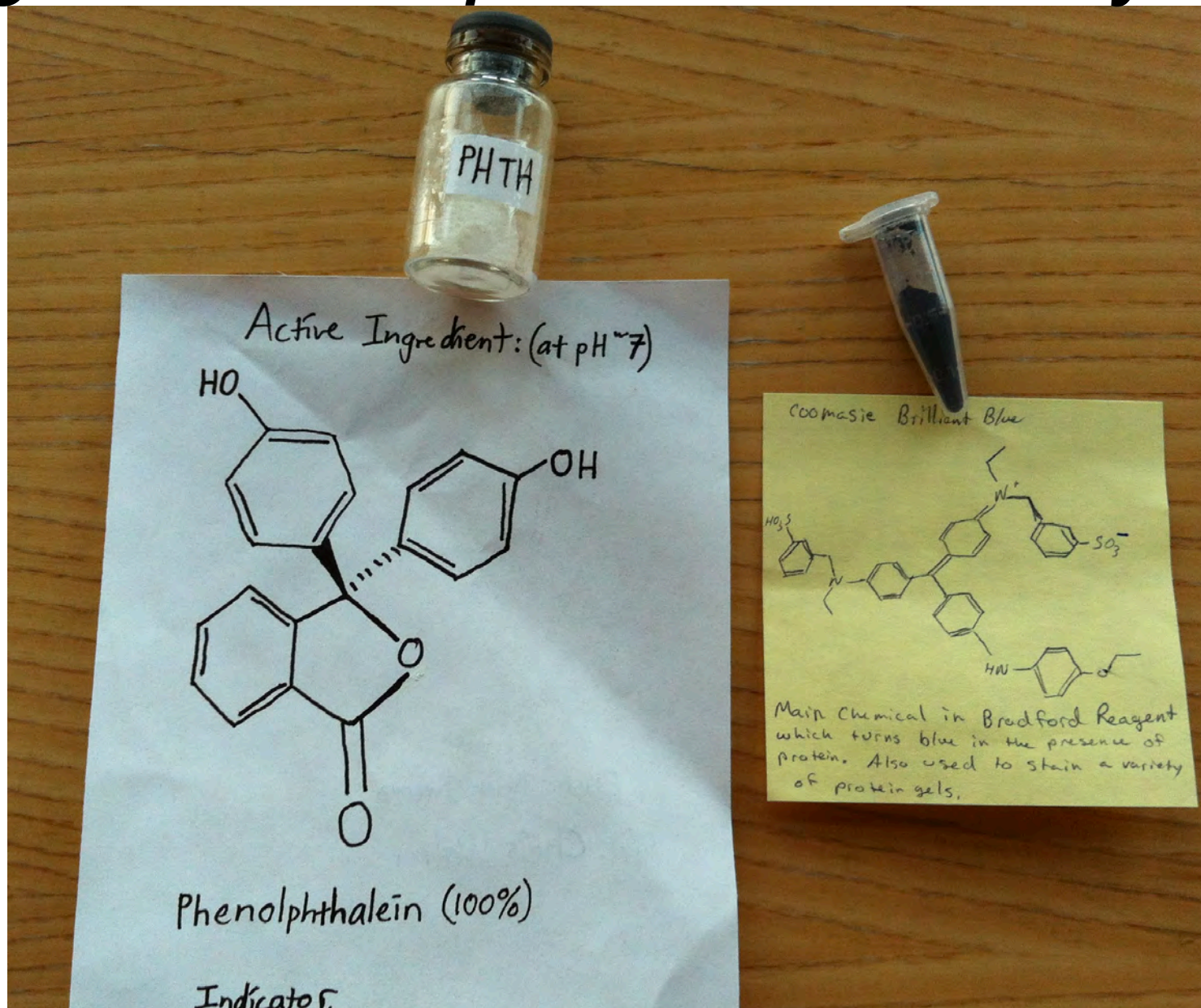
Active Ingredient:



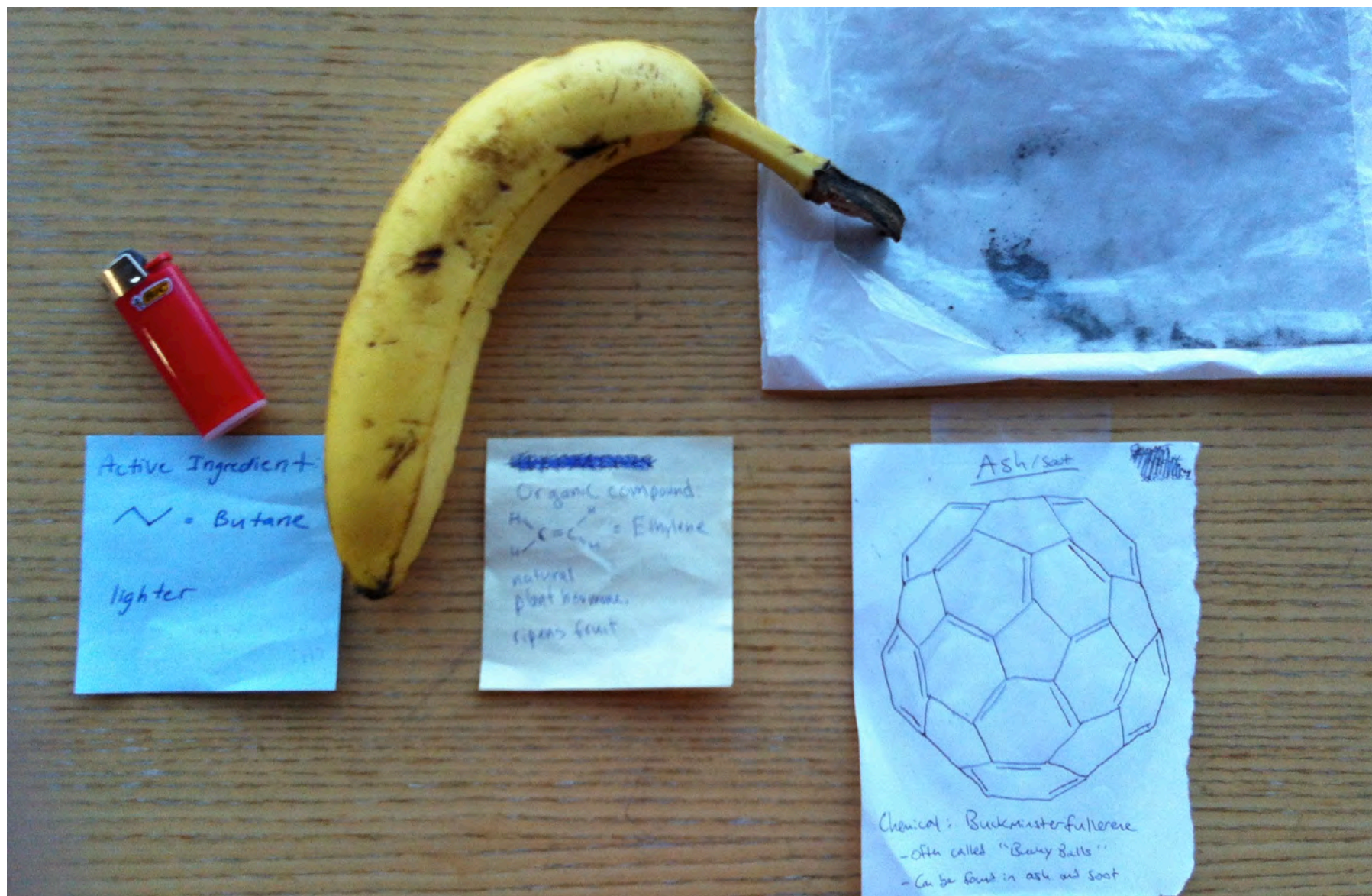
Indigo  
Dye

Dye for cotton yarn,  
denim cloth  
→ Clothing

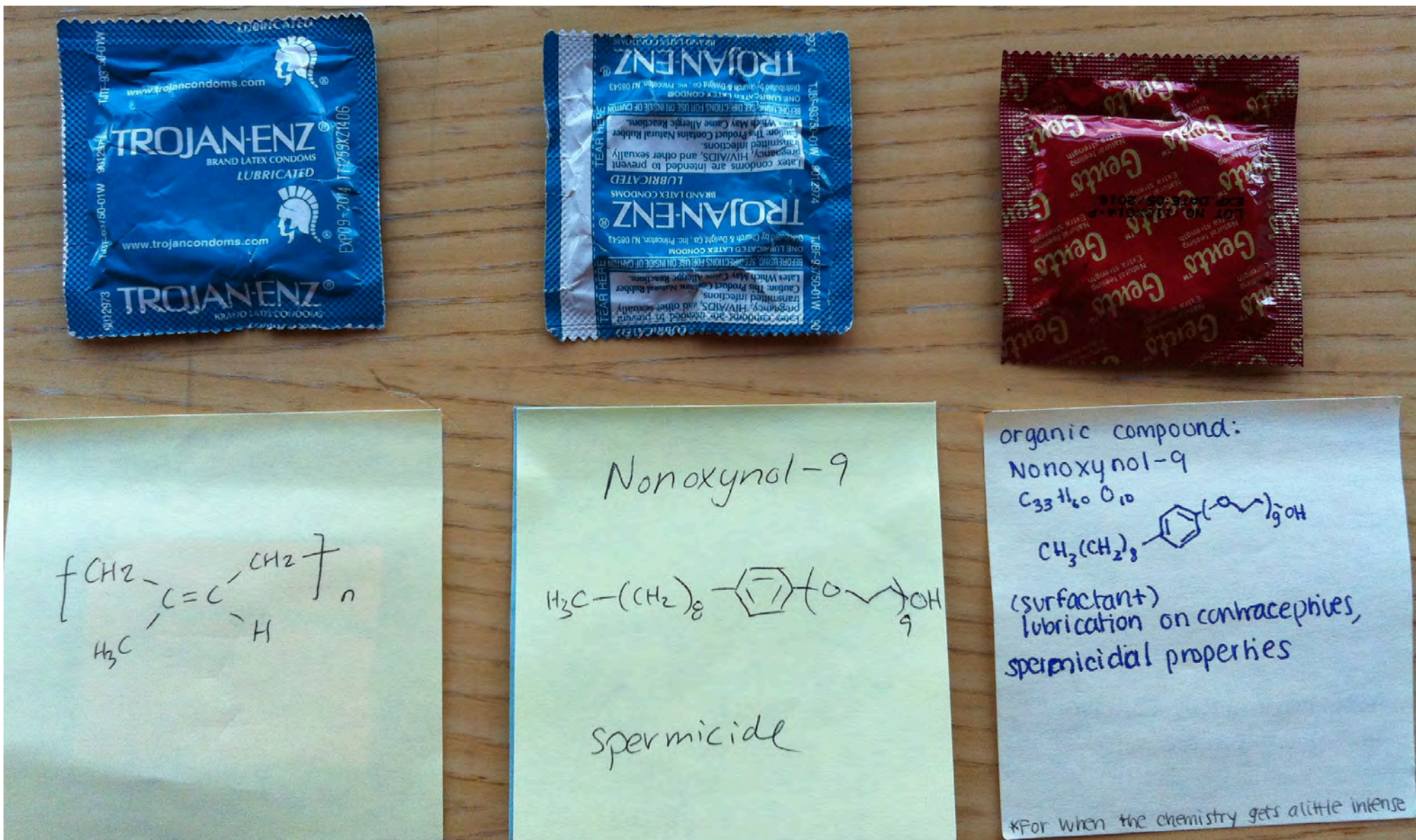
# Organic Compounds in Daily Life



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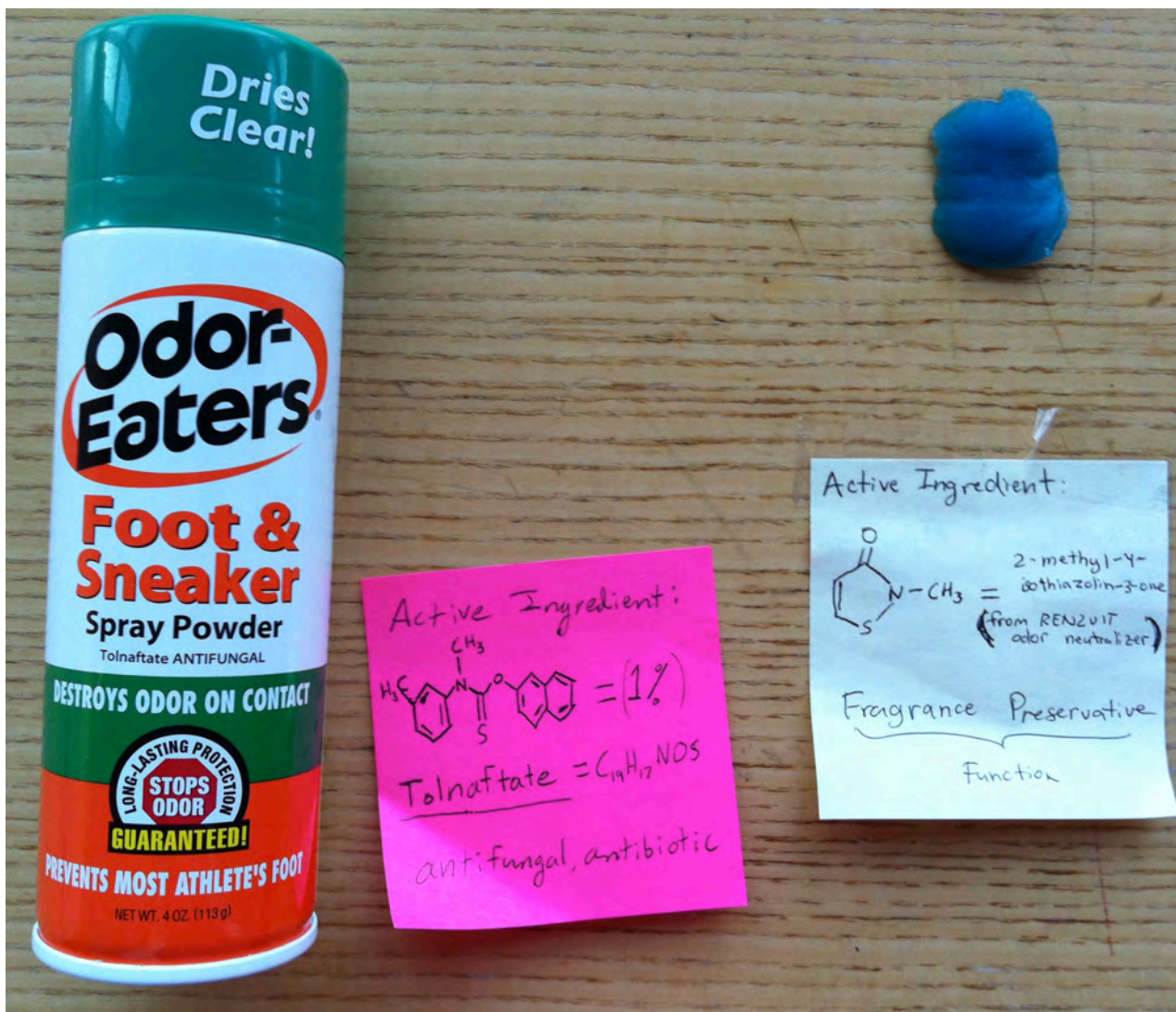


# Organic Compounds in Daily Life





# Organic Compounds in Daily Life



Deodorizing Agents