waag society

institute for art, science and technology

Microbiological techniques

Biohack Academy #3

Today’s Programme

Morning

- Make agar
- Sterilise agar
- Pour plates

Afternoon

- Contamination test
  - Environment
  - Sterile hood

What is agar?

- Yelly substance from algae
- Sugar
- Used for:
  - Food (subtitute gelatin)
  - Microbiology

History of Agar

- Angelina Fanny Hesse
- Walter Hesse
- **Robert Koch**

Koch’s Postulates

1. Microorganism causing diease must be found in abundance in all organisms suffering from disease, but not in healthy organisms.

2. The microorganism must be isolated from a diseased organism and grown in pure culture

3. The cultured organism should cause disease when introduced into a healthy organism

4. The microorganism must be reisolated from the inoculation, diseased exprimental host and being identical to the original host.

History of Agar

- Angelina Fanny Hesse
- Walter Hesse
- **Robert Koch**
- Julius Richard Petri

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC374482/

wikipedia

Types of Agar

Nutrient Agar

- Non-selective medium suitable for bacteria

- 1000 mL Demi-water contains (pH ~4.7):

Compound	Amount (g)
Yeast extract	2.0
Peptone	5.0
NaCl	5.0
Agar	15.0

- **Alternatives:**
  - Yeast extract → beef extract
  - Peptone (*amino acid, peptides, proteins*) → peptic digest of animal tissue
  - NaCl (*salt*) → Table salt
  - Agar (*jelling agent / sugar*) → Gelatin

Malt Agar

- Non-selective medium suitable for yeasts, fungi

- 1000 mL Demi-water contains (pH ~5.5):

Compound	Amount (g)
Malt extract	30.0
Agar	20.0

- **Alternatives:**
  - Malt extract → boil malt in water
  - Agar (jelling agent / sugar) → Gelatin

Setting the pH

- Normal pH: 7.0
- Acid (low pH): 0-7
- Basic (high pH): 7-14

	Acid	**Base**
What does it do?	Release a proton or hydrogen ion (H^+)	Release a proton or hydrogen ion (H^+)
Chemical	HCL	NaOH
Alternatives	Citric Acid	$NaHCO_3$
	Aquarium shop (pH/KH minus)	Aquarium shop (pH/KH plus)

Calculations

Calculations

Nutrient Agar (per 1000 ml)

Compound	Amount (g)
Yeast extract	2.0
Peptone	5.0
NaCl	5.0
Agar	15.0

250 ml

Compound	Amount (g)
Yeast extract	0.5
Peptone	1.25
NaCl	1.25
Agar	3.75

Calculations

Malt agar (per 1000 ml)

Compound	Amount (g)
Malt extract	30.0
Agar	20.0

250 ml

Compound	Amount (g)
Malt extract	7.5
Agar	5

Performing the practical

Before you start

1. Tie your hair
2. Wash your hands
3. Put on lab coat
4. Put on glasses
5. Clean your work space with alcohol

Performing the practical

1. Dissolve Agarmix in water
2.

Performing the practical

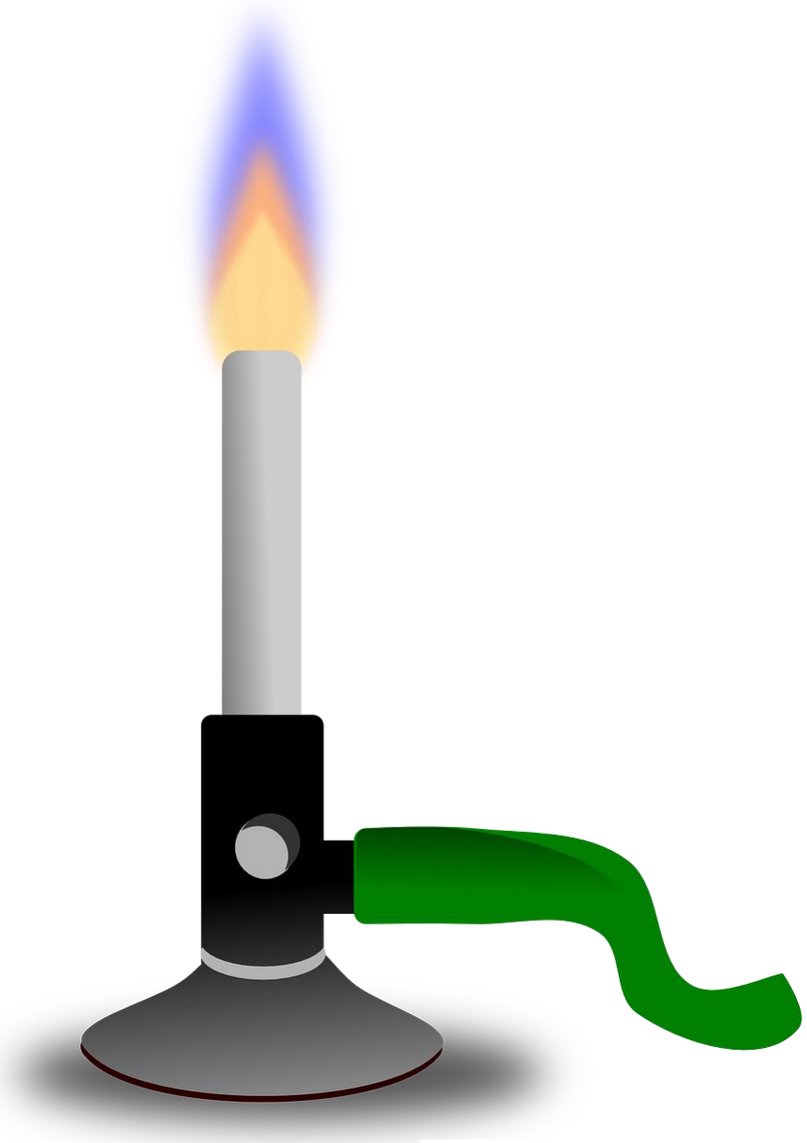
1. Dissolve Agarmix in water
2. Autoclaving for 20 min

Performing the practical

1. Dissolve Agarmix in water
2. Autoclaving for 20 min
3. Let agar cool down to room temperature

Performing the practical

1. Dissolve Agarmix in water
2. Autoclaving for 20 min
3. Let agar cool down to room temperature
4. Pour the plates



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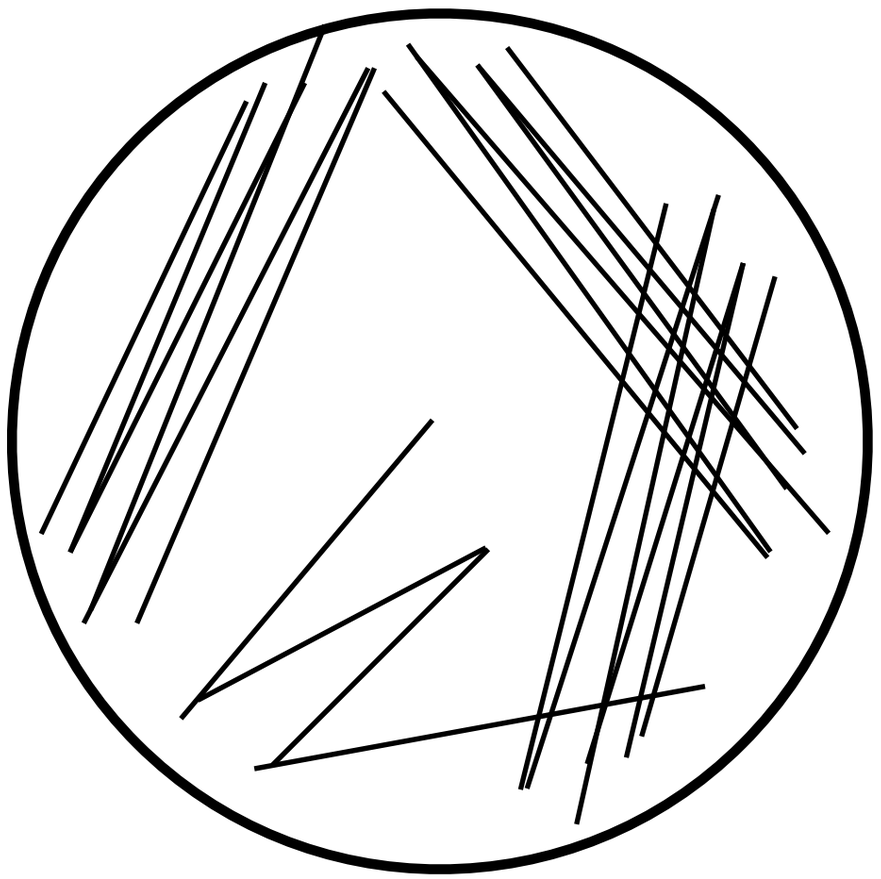
https://www.youtube.com/watch?v=PiWwnBbCrNs

Performing the practical

1. Dissolve Agarmix in water
2. Autoclaving for 20 min
3. Let agar cool down to room temperature
4. Pour the plates
5. Let plates dry

Performing the practical

1. Dissolve Agarmix in water
2. Autoclaving for 20 min
3. Let agar cool down to room temperature
4. Pour the plates
5. Let plates dry
6. Inoculation of plates



Tue 8/3 - Project Meeting (14:30 - 15:30)

1. What is your project idea?
2. Documentation site: show your documentation site
3. Plan for coming week
4. Crazy cool stuff? / Other comments

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