



# The characterization of raw material

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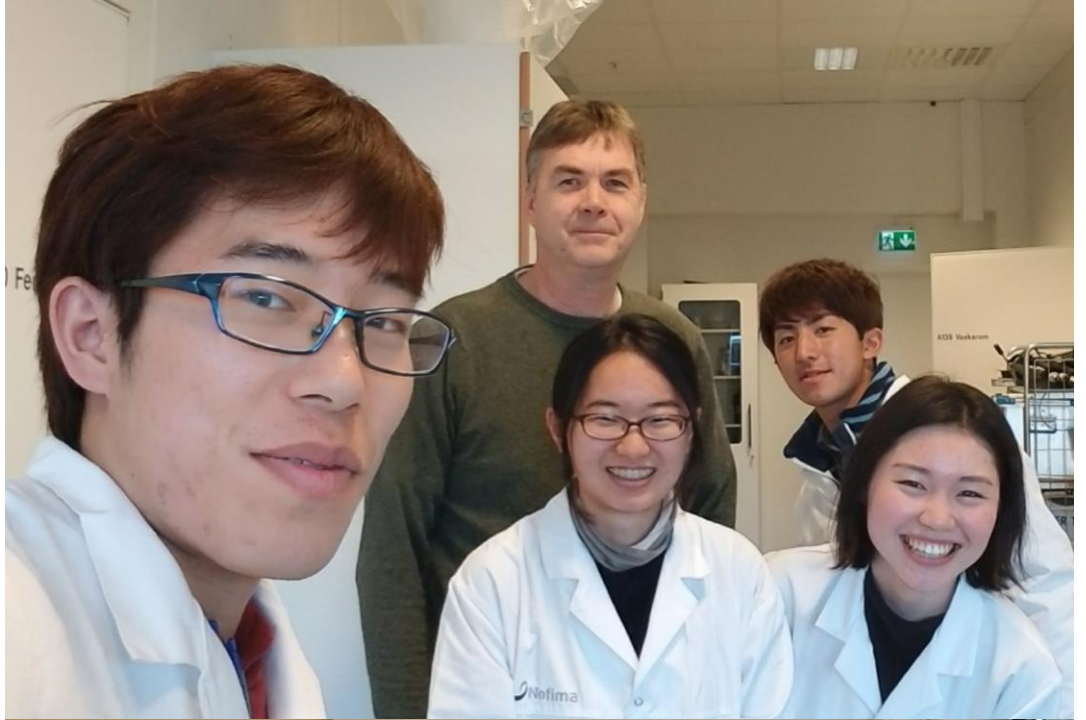
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# Outline

- Background
- Objective
- Material and Methods
- Results and Discussion
- Conclusions



# Background

## Nowadays

Filleting in foreign country  
and exported to Japan

## For more benefit

Filleting in Norway is needed.





**Objective**

**For more high quality Mackerel**

**The way of packaging**

**For more effective evaluation**



# Materials

- Vacuumed fillets × 20



- Glazed fillets × 20



# Methods

## 1) Number of muscle gaping

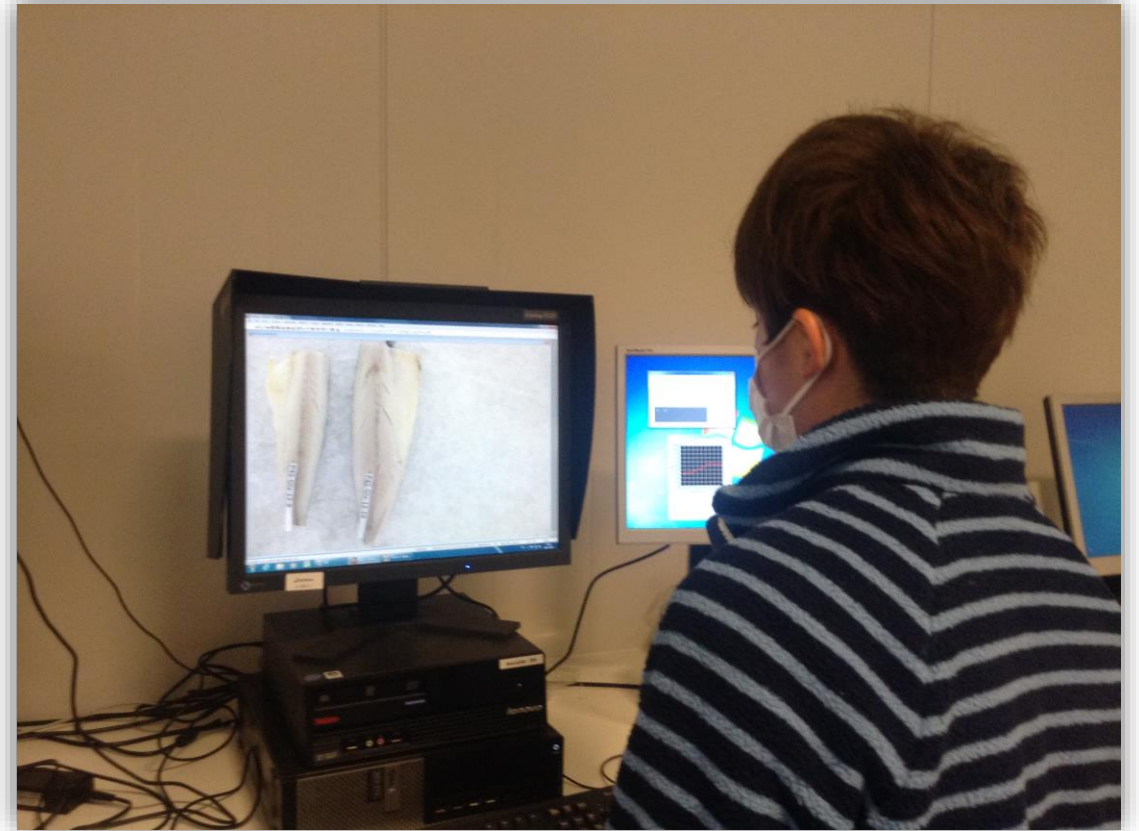
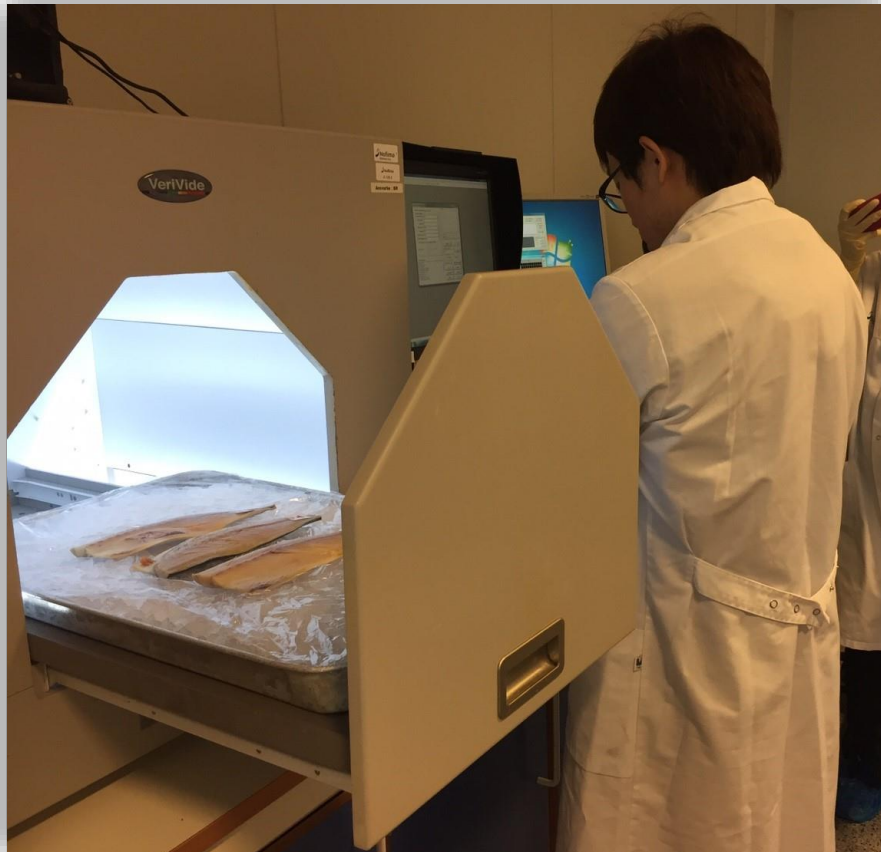


Scale	Description
0	No visual gaping
1	Small and less than 5 fractures
2	Small and less than 10 fractures or few large
3	Small and more than 10 fractures
4	Many large fractures
5	Many large fractures and the muscle are easily destroyed with light pressure



# Methods

## 2) Color analysis



# Methods

## 3) Texture analysis

Probe diameter 7 mm

Speed: initial 3 mm/s  
after touching the meat 1 mm/s





# Results

## Glazed



- Yellow
- Big gaping

## Vacuum Package



- Red
- Small gaping

# Results ~gaping~

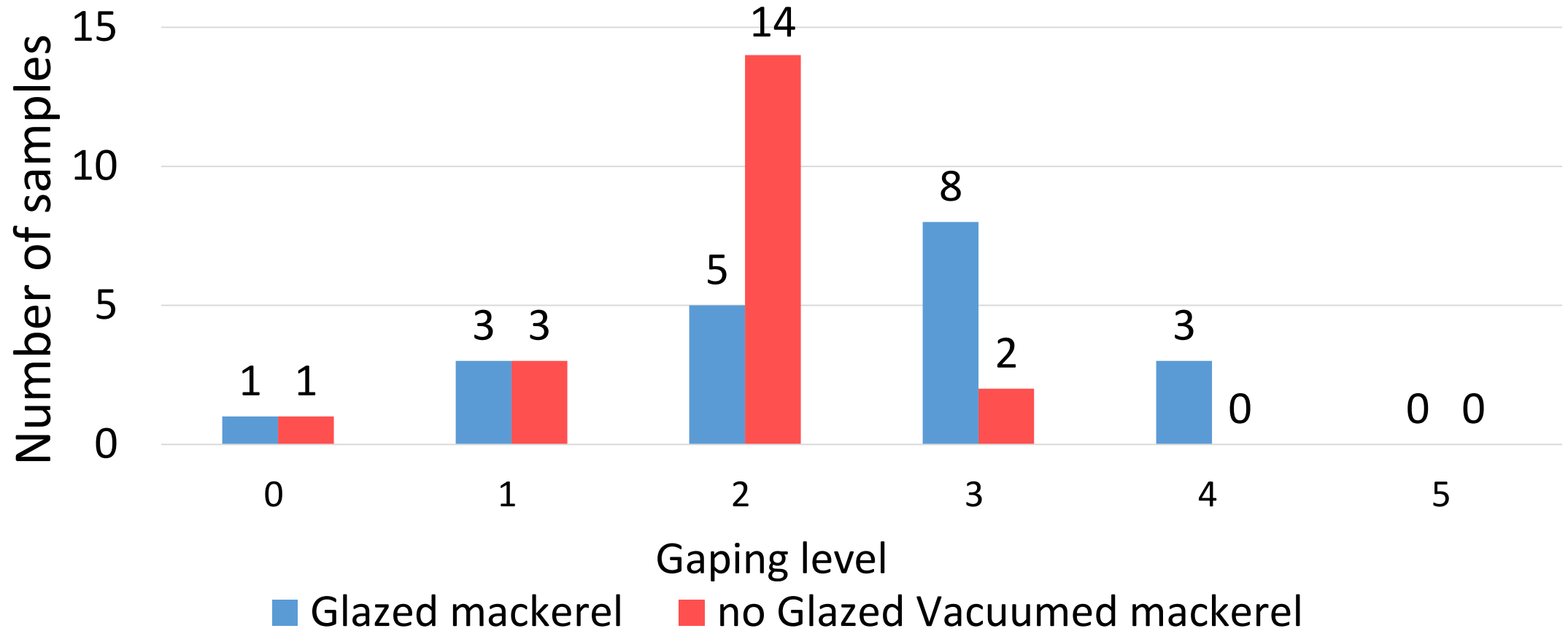


Fig 1: Gaping profile

→ Glazed mackerels have more serious gaping

# Results ~texture~

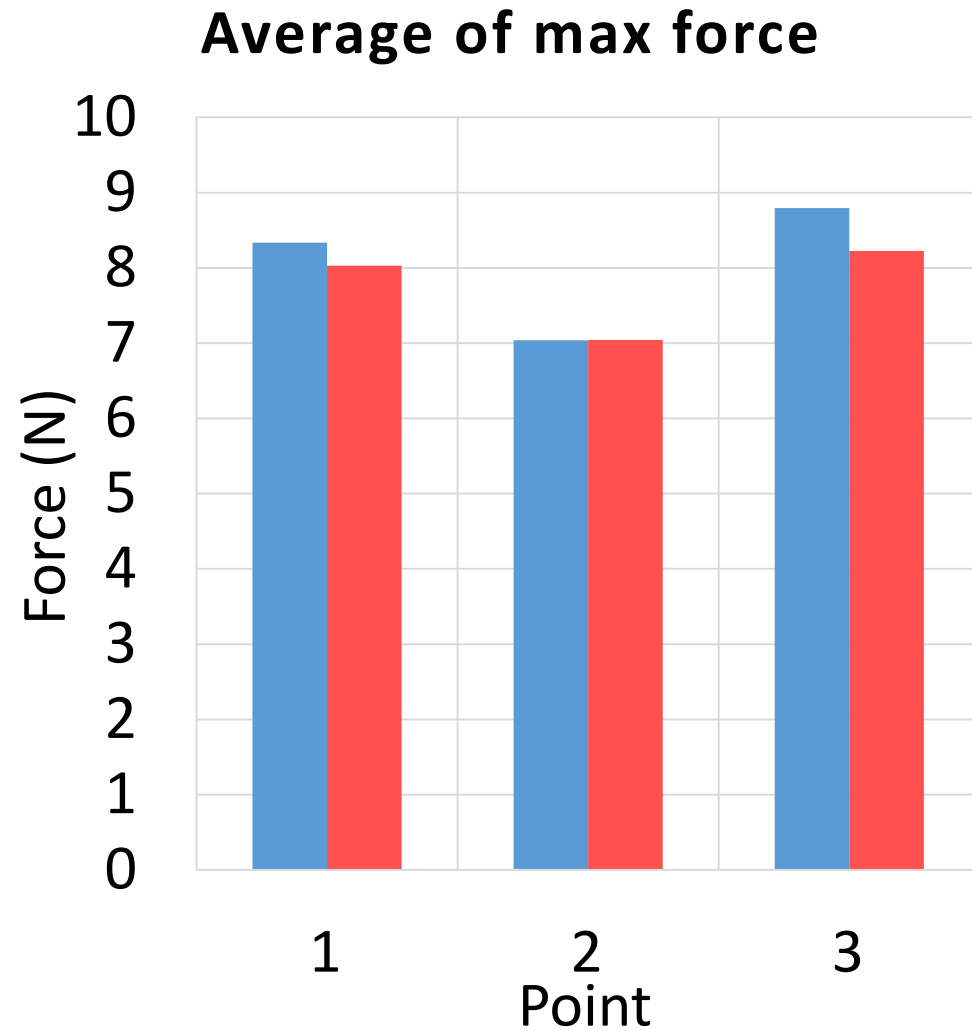


Fig 2: Average of max force

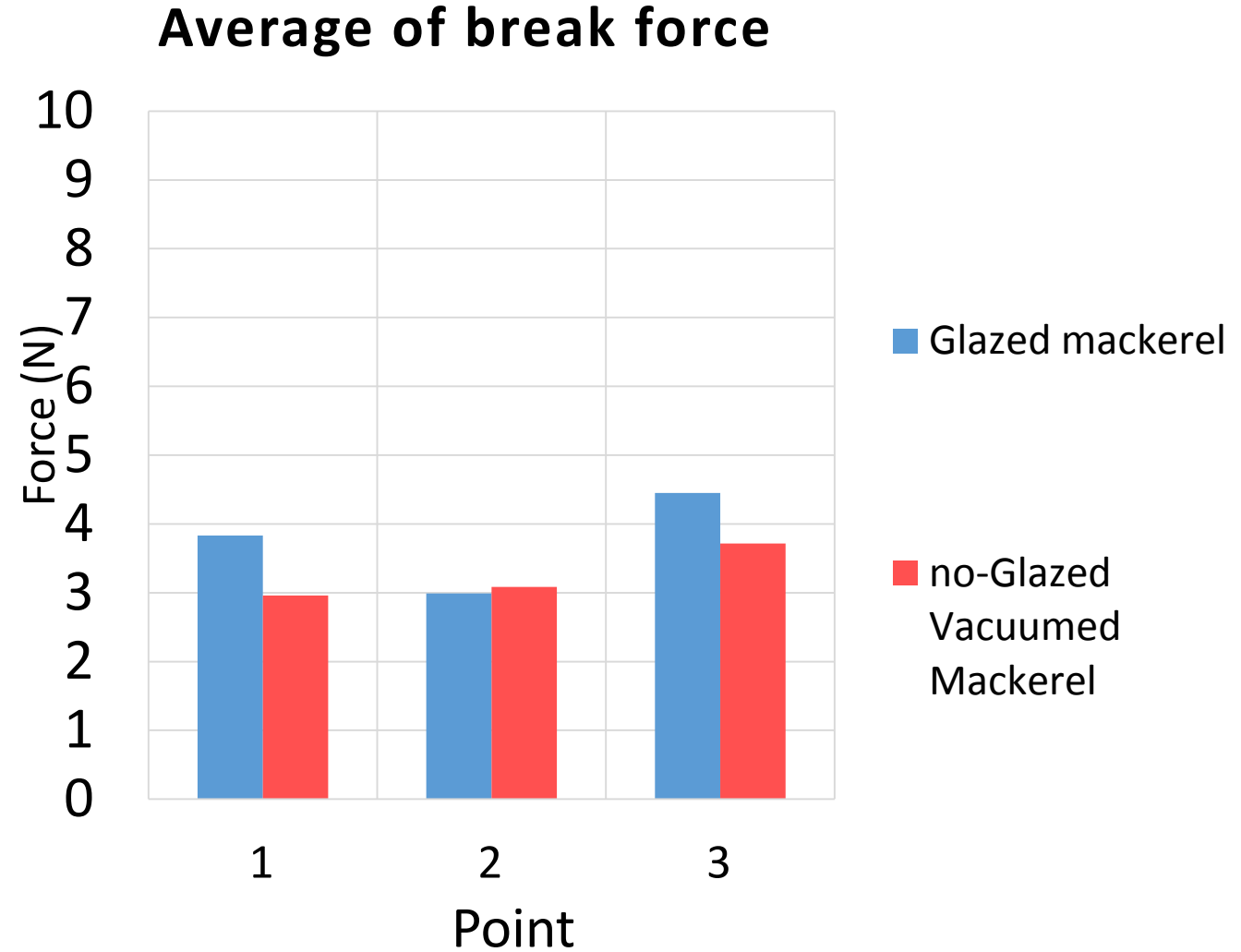


Fig 3: Average of break force



# Results ~Color analysis~

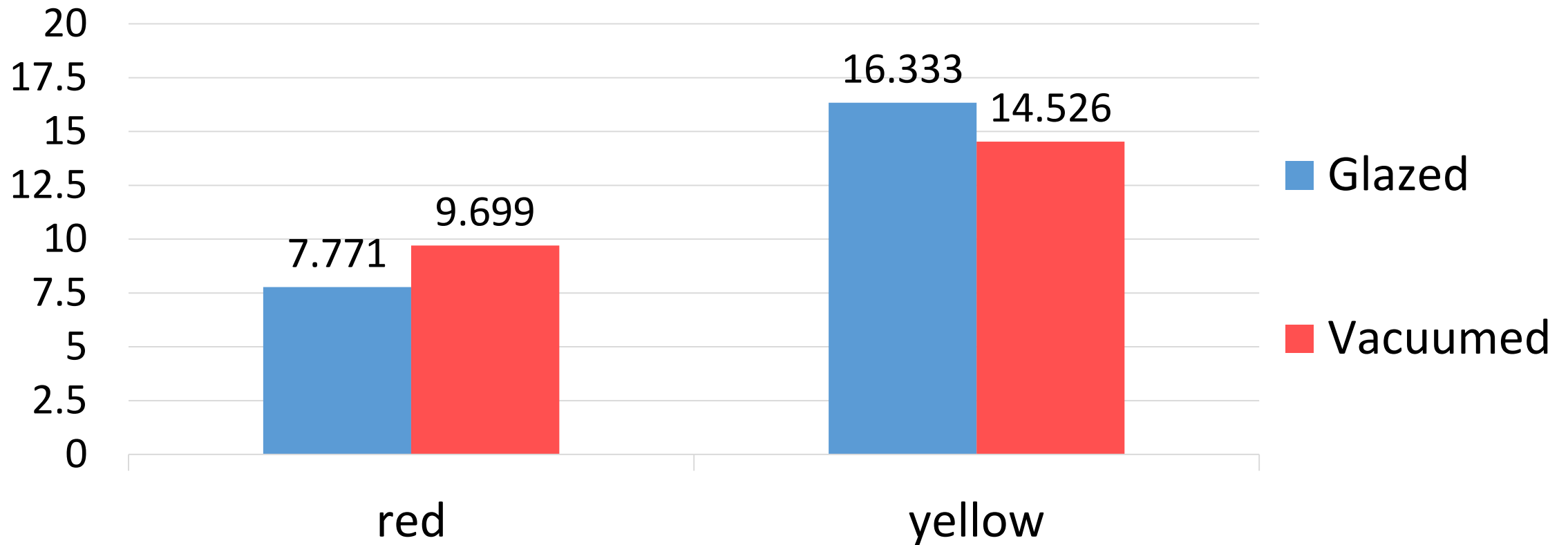


Fig 4: Color analysis

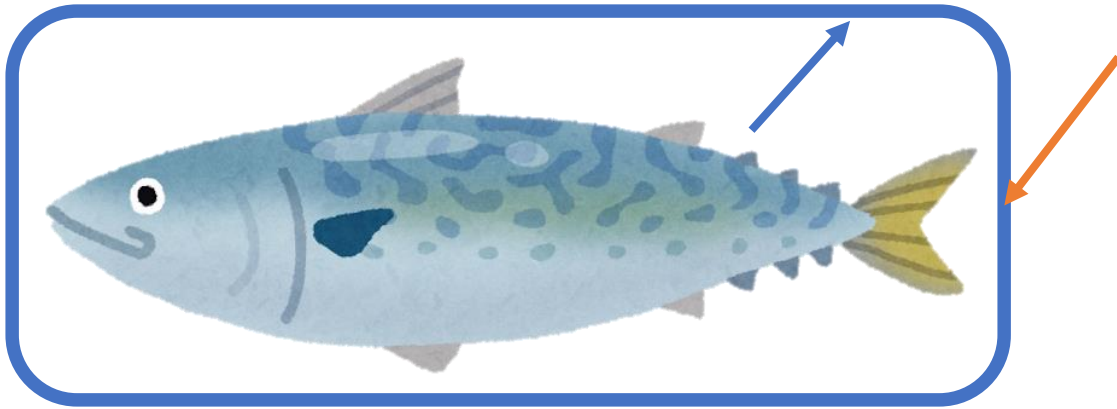
Vacuumed mackerels get { higher yellow score  
lower red score

# Discussion

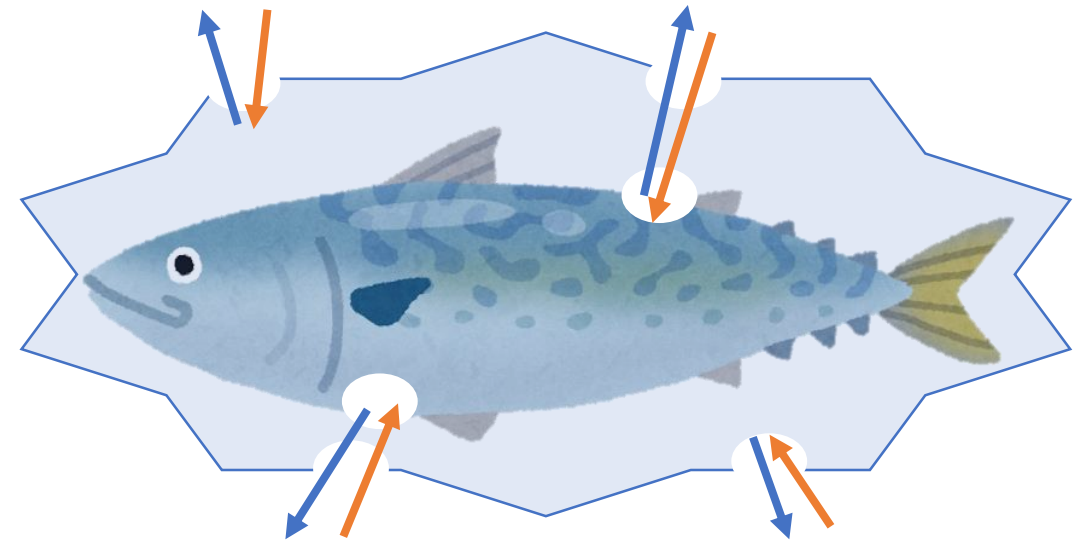
- **Gaping: Small and few in vacuum package**
- **Color: Glazed is higher Yellow score**
  - Fat Oxidation
  - Plastic bags can protect the mackerel

# Discussion

## - Fat Oxidation



Vacuum package



Glazed

←  $\text{H}_2\text{O}$

←  $\text{O}_2$



# Discussion

- **Texture: There is not a correlation with packaging**

- The same effect of enzymes

- Using microscope and observation of condition of cells

# Discussion

- What points are Japanese take care when they buy mackerel?

Taste

Price

Health benefit

Safe

Convenience

Appearance



High quality

# Discussion

- **The improvements of this experiment**

Taste

Safe

- Analysis of contents of ATP and its related compounds

Taste

Safe

Health benefit

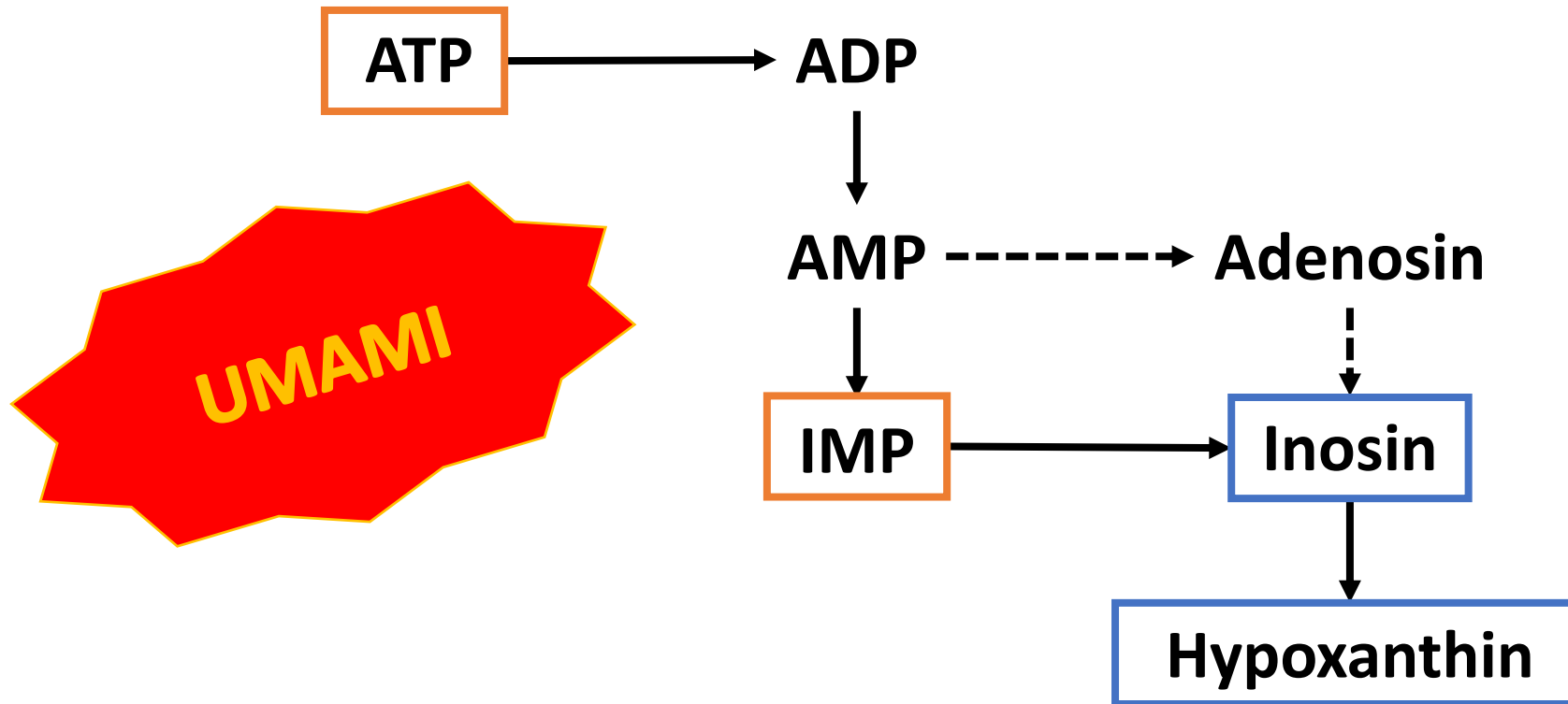
Appearance

- Analysis of fat oxidation



# Discussion

- Analysis of contents of ATP and its related compounds



# Conclusions

- The texture is not affected by different packaging.
- Vacuum packaging can be few gaping and good color.

→ Vacuum packaging can be good **Appearance**

# Conclusions

- Japanese take care a lot of points as quality.

→ **Need various factors to consider**

- Vacuum packaging is not perfect

→ **We have to keep improving!!**



Thank you for your attention

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