AN-NAJAH NATIONAL UNIVERSITY
FACULTY OF AGRICULTURE & VET.MED.
NUTRITION & FOOD TECHNOLOGY DEPARTMENT

Production Processes Assessment for (Cucumber pickles in brine)

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Introduction

- **Pickling** is the process of preserving or expanding the lifespan of food by either anaerobic fermentation in brine or immersion in vinegar,it's one of the oldest known methods of preserving foods

- The acidity or salinity of the solution, the temperature of fermentation, and the exclusion of oxygen determine which microorganisms dominate, and determine the flavor of the end product.

Introduction

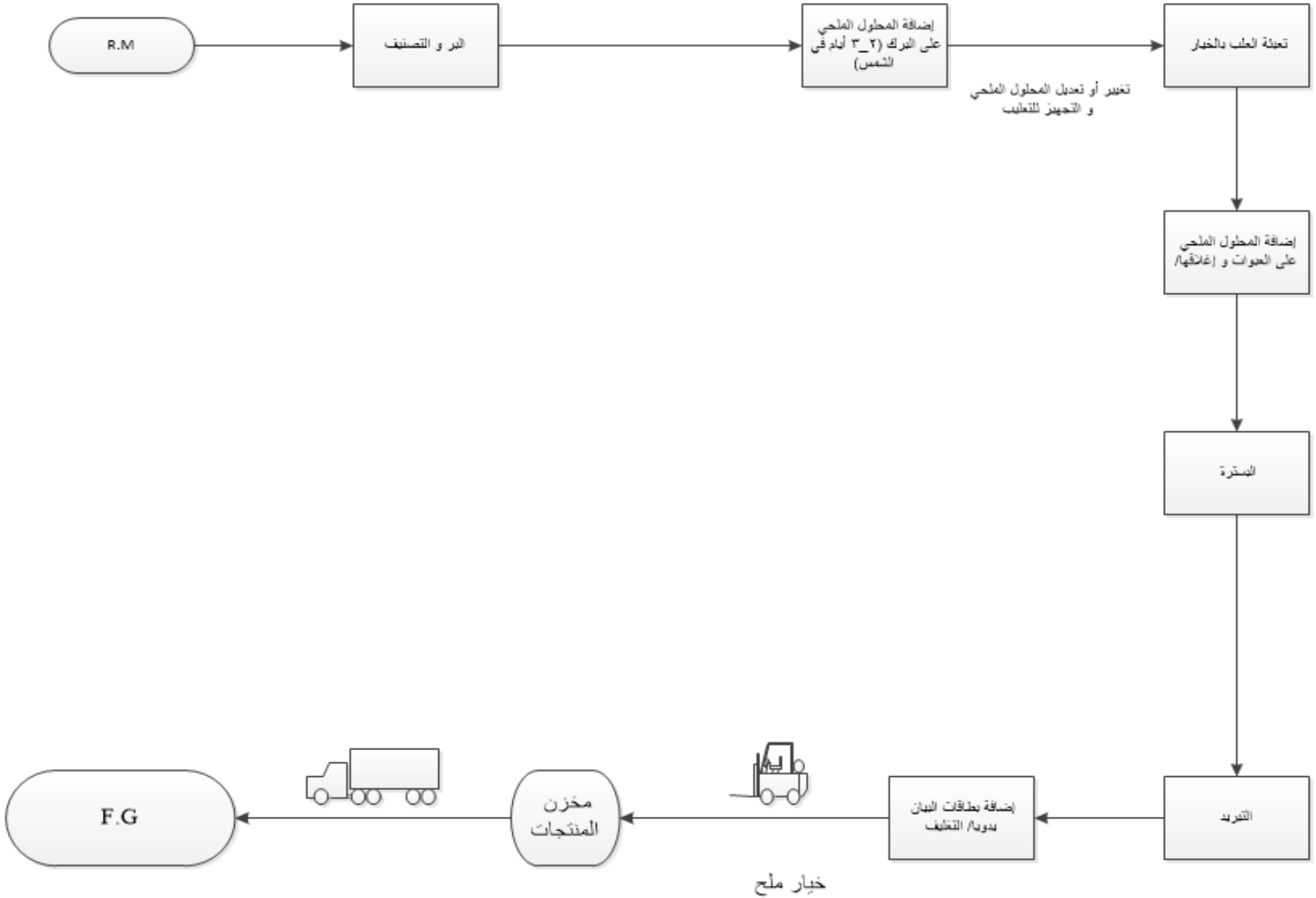
- There are many types of pickles. Each calls for a different combination of ingredients and preparation methods.
- TYPES OF PICKLES :
- Fermented pickles
- Refrigerated dills.
- Fresh-pack (or quick process) pickles

Case Study

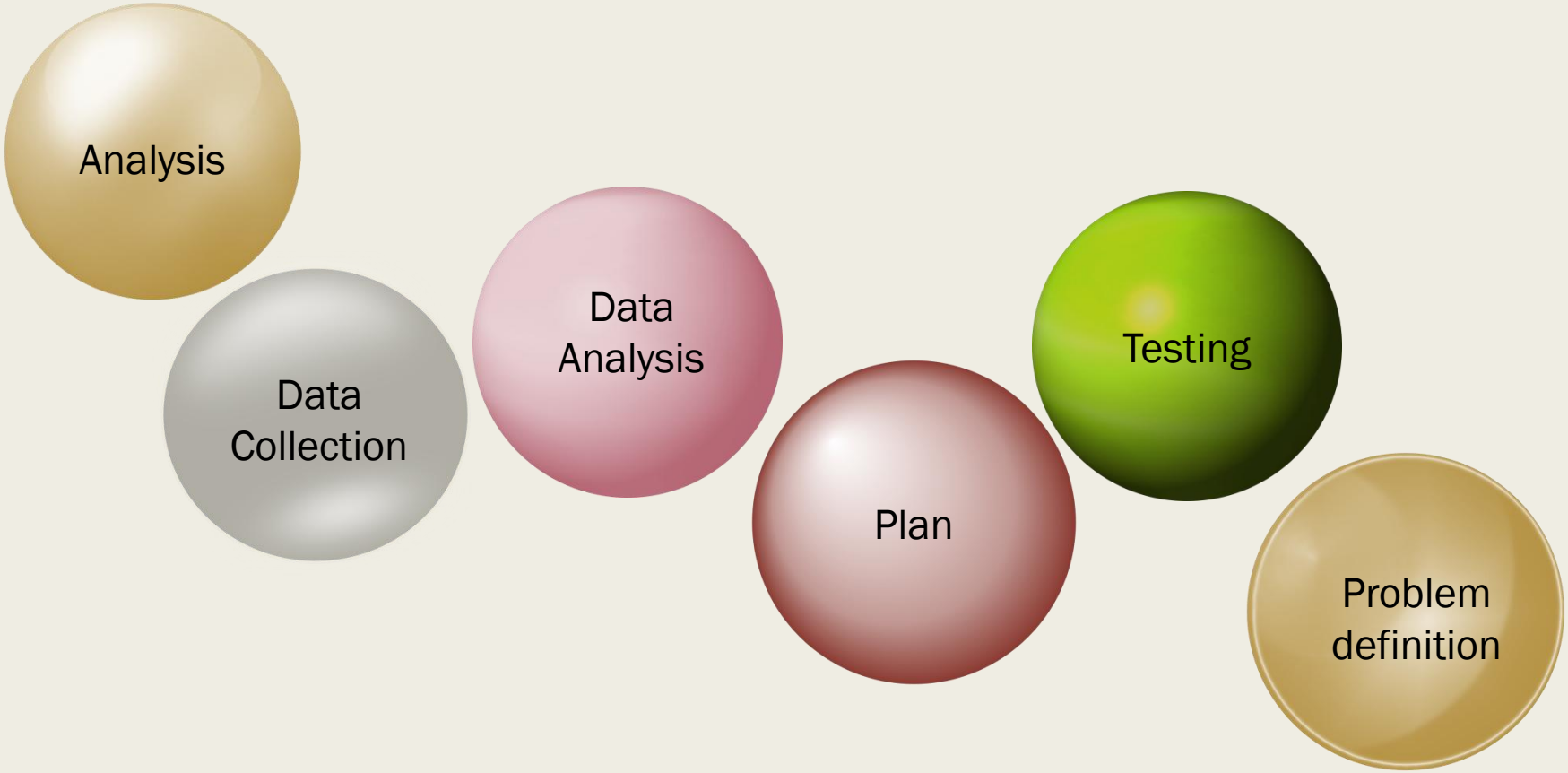
- A Palestinian company was established in 2014, have two small scale factories, produce more than 80 different product .
- Food health and safety is the primary concern for the company.
- The optimization of pickle quality

Case Study

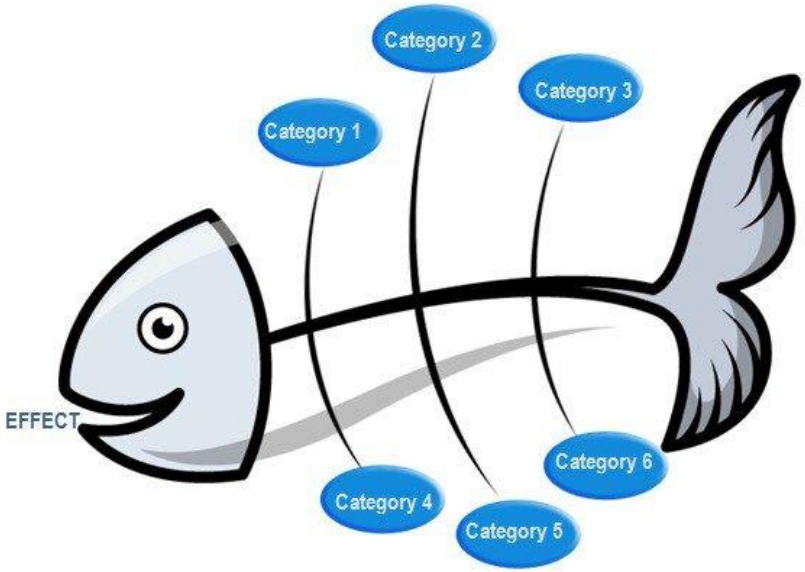
- A need to evaluate the production lines efficiency, to make a decision about the cleaning and disinfectant process.
- Project Brief :
- In only 30 days, we observed and collect data from usual day work ,set a table of parameters and make samples according to these parameters , using over than 200Kg of fresh cucumbers, about of 350L of water, 15Kg of R.M.
- using the actual production lines to simulate the actual process , which restrict our time to implement our experiment to suit the production time
- A crew of four to apply the process.


R.M
البر و التصنيف
إضافة المحلول الملحي على البرك (٢_٣ أيام في الشمس)
تعبئة الحلب بالخيار
تغيير أو تعديل المحلول الملحي و التجهيز للتعليب
إضافة المحلول الملحي على العبوات و إغلاقها/
البسترة
التبريد
إضافة بطاقات البيان يدويا/ التغليف
مخزن المنتجات
F.G
خيار ملح

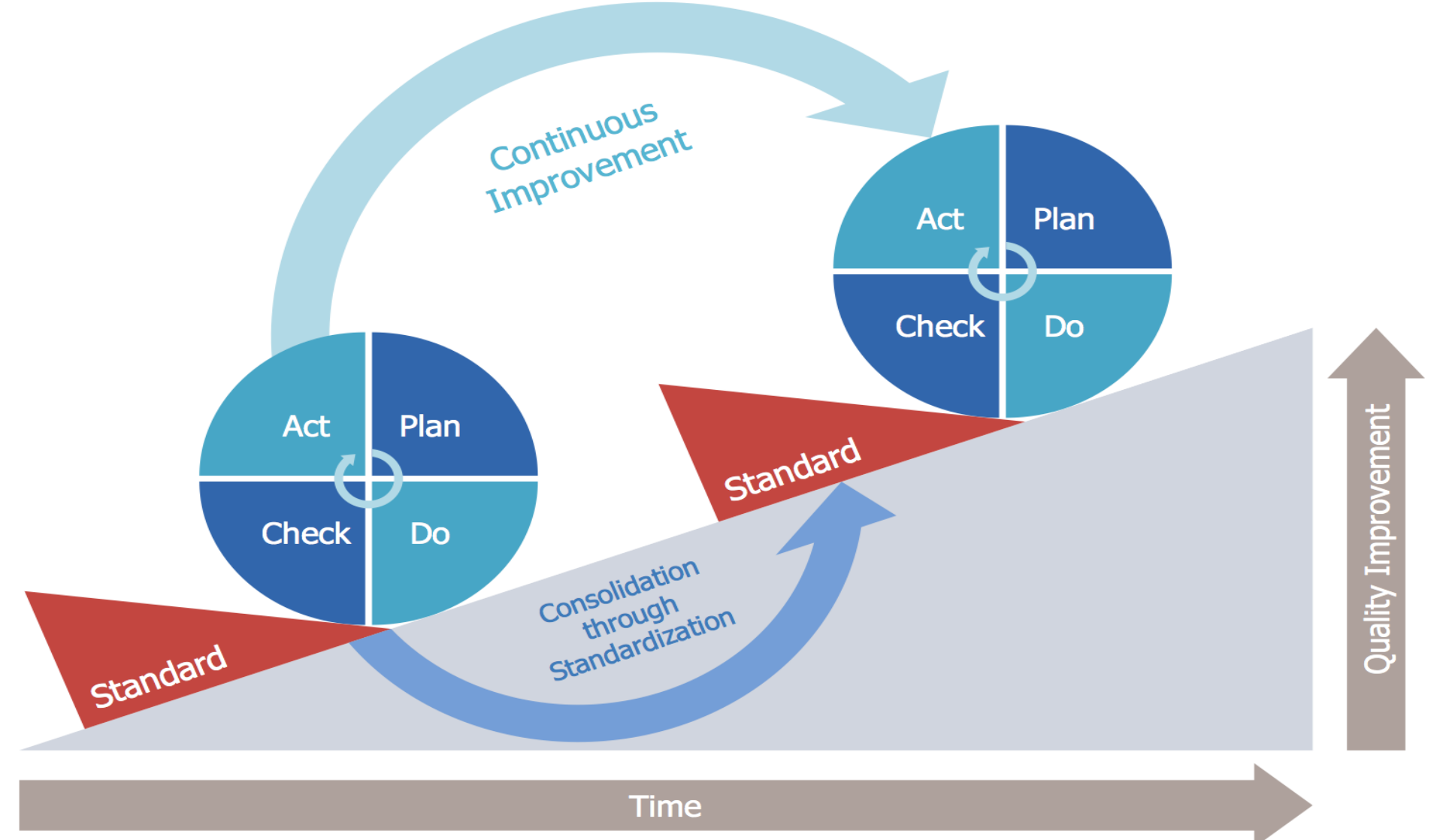
Methodology



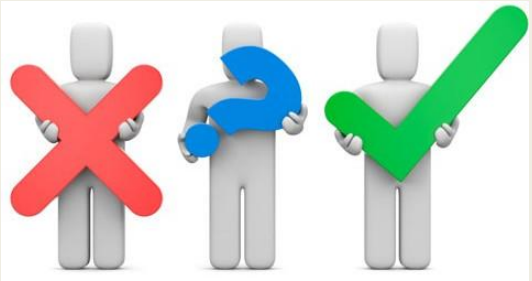
Methodology

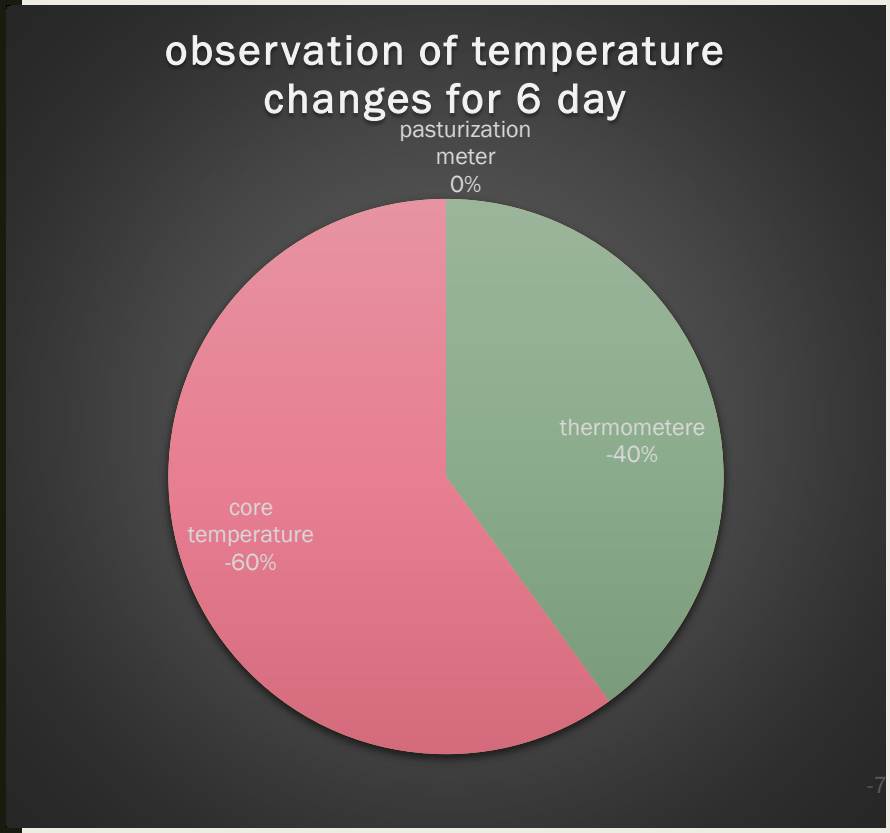


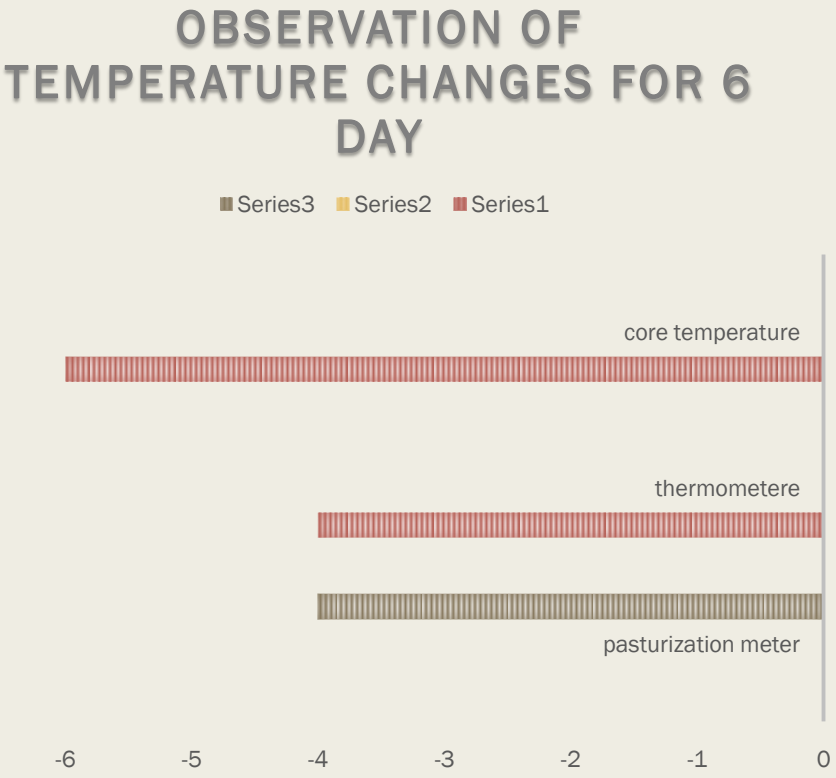
Methodology



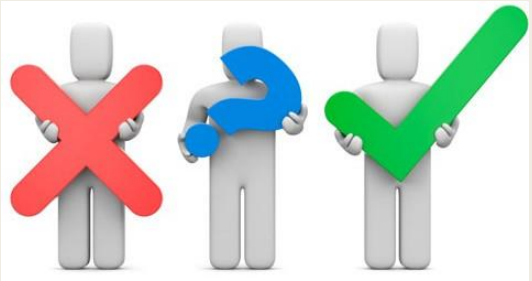
Results

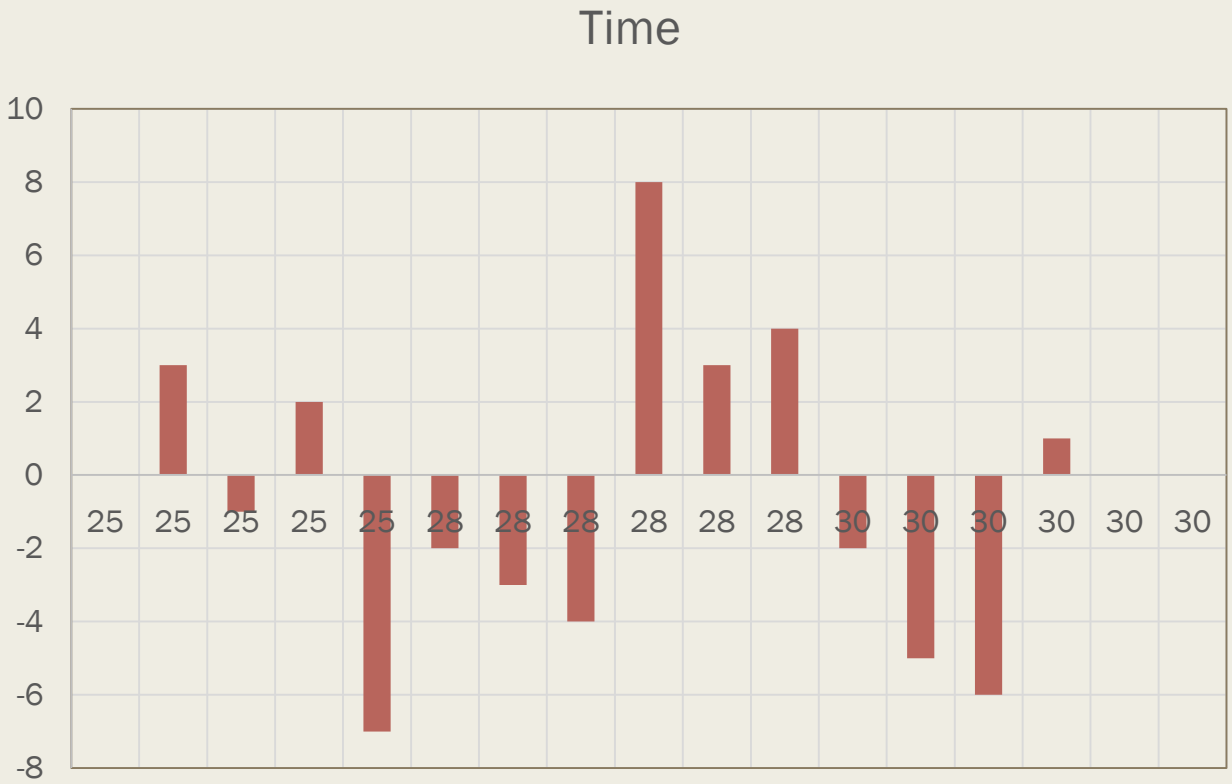



observation of temperature changes for 6 day
pasturization meter 0%
thermometere -40%
core temperature -60%


OBSERVATION OF TEMPERATURE CHANGES FOR 6 DAY
Series3
Series2
Series1
core temperature
thermometere
pasturization meter
-6
-5
-4
-3
-2
-1
0

Results



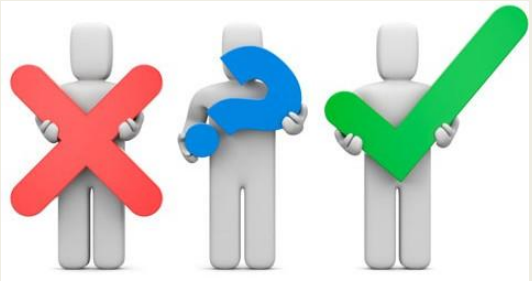


color	Soaking water viscosity	smell	Cleaning Stage			
Acceptable	Acceptable, white coating	Acceptable	E	Z	Original	1
Acceptable	Acceptable	Acceptable	E	Y	Increasing vinegar 1%	2
Acceptable	Acceptable	Acceptable	E	X	Increasing salt 7%	3
Acceptable	Viscose	Acceptable	A	W	Increasing salt 7%, Increasing vinegar 1%, reducing preservative 50%	4
Acceptable	Acceptable	Acceptable	A	V	Increasing salt 7%, Increasing vinegar 1%, additive (x) 5g/kg	5
Acceptable	High viscosity(white coating)	margins	A	U	reducing artificial additive 100%	6
Acceptable	Acceptable (white coating)	margins	A	T	reducing preservative 25%, Increasing vinegar 1.5%	7
Acceptable	Very high	margins	B	S	Washing raw materials with Municipal water, increasing vinegar 1.5%, reduction of preservative 30%.	8
Acceptable	Acceptable	Acceptable	A	R	Additive(X) 15g/L, salt 7%, preservative 30% reducrtion.	9
Acceptable	Acceptable	Acceptable	A	Q	Additive(X) 15g/L, salt 7%, artificial additive A 10% increase, decrease preservative 25%	10

Salt content%	pH	Cleaning Stage			
2.1802667	3.44	E	Z	Original	1
2.3093333	3.2	E	Y	Increasing vinegar 1%	2
3.8933333	3.36	E	X	Increasing salt 7%	3
3.2741333	3.25	A	W	Increasing salt 7%, Increasing vinegar 1%, reducing preservative 50%	4
2.8306667	3.21	A	V	Increasing salt 7%, Increasing vinegar 1%, additive (x) 5g/kg	5
1.9130667	3.48	A	U	reducing artificial additive 100%	6
2.8933333	3.06	A	T	reducing preservative 25%, Increasing vinegar 1.5%	7
2.652	3.12	B	S	Washing raw materials with Municipal water, increasing vinegar 1.5%, reduction of preservative 30%.	8
3.8933333	3.41	A	R	Additive(X) 15g/L, salt 7%, preservative 30% reducrtion.	9
2.7573333	3.43	A	Q	Additive(X) 15g/L, salt 7%, artificial additive(A)10% increase, decrease preservative 25%	10

Microbial test			Cleaning Stage			
Yeast and molds	TPC	FC				
Yeast=40	100	Nil	E	Z	Original	1
Yeast=30	90	Nil	E	Y	Increasing vinegar 1%	2
Yeast=30	60	Nil	E	X	Increasing salt 7%	3
Yeast=10	26	Nil	A	W	Increasing salt 7%, Increasing vinegar 1%, reducing preservative 50%	4
Yeast=12	45	Nil	A	V	Increasing salt 7%, Increasing vinegar 1%, additive (x) 5g/kg	5
uncountable	240	Nil	A	U	reducing preservative 100%	6
Yeast=95	180	Nil	A	T	reducing preservative 25%, Increasing vinegar 1.5%	7
Yeast=27	115	Nil	B	S	Washing raw materials with Municipal water, increasing vinegar 1.5%, reduction of preservative 30%.	8
Yeast=30	47	Nil	A	R	Additive(X) 15g/L, salt 7%, preservative 30% reducrtion.	9

Results



	Microbial test					
Yeast and molds	TPC	FC	Temp.	Time	#Group	
Nil	Nil	Nil	30	82	A	1
Nil	Nil	Nil	17	87	B	2
Nil	Nil	Nil	35	75	D	4
Nil	Nil	Nil	25	79	E	5

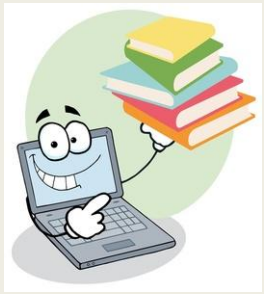
Conclusions & Recommendations

- In common sense the fluctuation of time –temperature combination will affect the quality of the final product , if the initial microbial load is high this fluctuation , may lead to leave some cfu which will lead eventually to undesirable microbial load ,reducing the shelf life of the product.
- Nevertheless, increasing the time or the temperature over the need , will affect the quality of the product from sensory and nutritional aspects.
- Maintaining an appropriate temperature is one of the most important factors to food safety.
- The results shows the possibility of total remove of preservative especially in small classification.

Conclusions & Recommendations

- Modifying the cleaning and disinfectant stages based on the result:
- Using stem between steps
- Using chemicals when the tanks of cucumber are not used for more than 3 days.
- Reducing the pasteurization temperature used 3 degree, which will lead to increase the efficiency of the production line, also reducing the cost of fuel used.

References



- Tyrewala, Ameet S., Doug Nelson, and Barbara Almanza. "The effects of door opening and food placement on food temperature within the refrigerator when power is lost during a disaster." (2011).
- Food and Drug Administration. "Evaluation and definition of potentially hazardous foods." (2001).


Thank you