PHYSICAL ,CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF NAMKEEN PRODUCTS

An Industrial Training Report submitted

for the partial fulfillment of the Degree of Master of Science

By

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[M.Sc. (Microbiology), Semester IV]

Under the supervision of

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RAJKOT (GUJARAT) – 360005

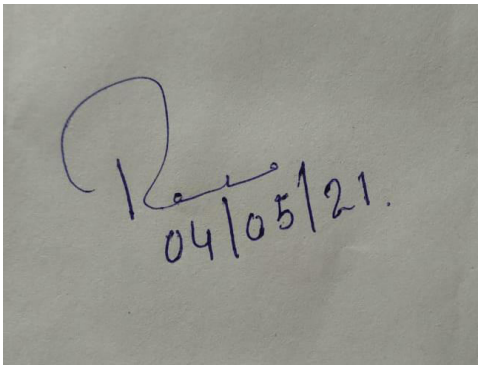
2019-2021

ANNEXURE 1

(On letterhead of the Industry)

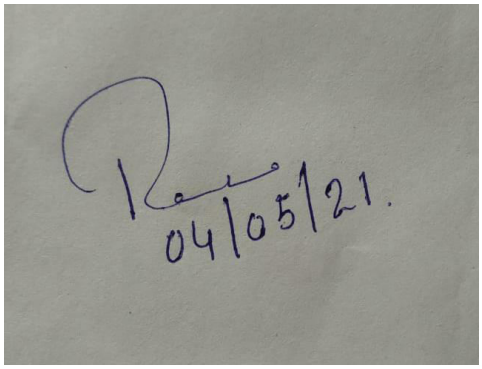
C E R T I F I C A T E

This is to certify that this training report entitled "PHYSICAL, CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF NAMKEEN PRODUCTS" was successfully carried out by Mr. /Miss MARADIYA KAIRAVI RITESHBHAI towards the partial fulfillment of requirements for the degree of Master of Science in /Microbiology of Atmiya University Rajkot. It is an authentic record of his/her own work, carried out by him/her under the guidance of Dr.RACHNA JOSHI for a period of 1 MONTH during the academic year of 2019-2021. The content of this report, in full or in parts, has not been submitted for the award of any other degree or certificate in this or any other University.



Dr.RACHNA JOSHI

Name & Signature of the Head of the Department



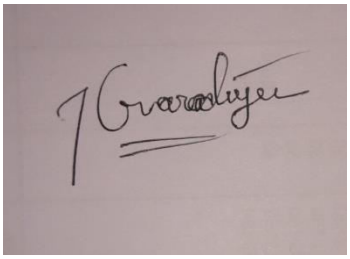
Dr.RACHNA JOSHI

Name & Signature of the supervisor

ANNEXURE 2

D E C L A R A T I O N

I hereby declare that the work incorporated in the present dissertation report entitled **"PHYSICAL, CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF NAMKEEN PRODUCTS"** is my own work and is original. This work (in part or in full) has not been submitted to any University for the award of any Degree or a Diploma.



Maradiya kairavi riteshbhai

Date 4-5-2021 (Name and signature of Student)

ANNEXURE 3

Acknowledgement

I am glad to represent this report and I feel that it is my duty to offer my sincere thanks to all those who have helped me in this regard.

I'm thankfull to Dr.Rachna joshi head of the department of BALAJI WAFER PVT.LTD in helping and guiding me for my training.

I would like to thank M.N.Virani college's principle and respected M.sc microbiology field's faculty.

INDEX :

List of photographs:

Abbreviations:

Physical, chemical and microbiological analysis of namkeen product and water analysis, milk analysis and food adulteration test are performed .

Abstract:

The physical ,chemical and microbiological analysis of namkeen products (aloosev).all techniques are performed under the guidelines of balaji wafer company .Each result is specified and confirmed by performing conformation tests.

Introduction

The journey of Balaji Group in year 1976 by the member of Virani family. For supplying wafers and namkeens to local brands to the patrons of Astron Cinema, Rajkot. Due to the shore supply of that product they decided to make their own product line in year 1982.

By the overwhelming retail success they inspired to set a semi automatic plant.

Instead of preparing wafers by the traditional frying method this semi automatic plant boosted the quality, taste and more sales also.

Winning the heart by quality and great taste and distributing sufficient dealer margin is a winning strategy of Balaji Group. People's love is the most memorable achievement.

Defination of namkeen :A small savoury snack or dish.

Namkeen products :

Balaji Rajwadi Chevdo ,Balaji Farali Chevdo ,Balaji Shing Bhujiya ,Balaji Khatta Mitha Mix ,Balaji Masala Peas ,Balaji Sev Murmura ,Balaji Kela Masala Wafer, Balaji Kela Mari Wafer ,Balaji Aloo Sev ,Balaji Tikha Mitha Mix ,Balaji Ratlami Sev ,Balaji Masala Shing ,Balaji Nimbu Chatka Shing Bhujiya ,Balaji Chana Dal ,Balaji Mung Dal

By performing physical and chemical and microbiological techniques analyzing the namkeen products and determining the quality of products

a) Materials and Methods:

1)Physiscal analysis

a) **Sensory analysis of namkeen** : the sensory analysis determines the physical changes like above
Procedure :

- Sight – appearance ,size ,colour ,shape
- Smell – aroma
- Taste –flavour
- Touch – texture

b) Moisture :

Aim : after removing defective pieces of the wafer or fried namkeen moisture measurment sensor use for measuring moisture present in the wafer /namkeen .

Moisture measurment are used to measure the percentage of water in a given substance ,this information can be used to determine is the material is ready for use ,unexpectedly wet or dry otherwise in need of further inspection.

Procedure : take 5g of crushed sample and put in moisture meter and note the reading till time reaches to 0.05 .

(fig.1 moisture meter)

2)Chemical analysis

A) butyro (BR) :

Aim :Thids test is performed to determin the purity of oil.

Instrument : BUTYRO REFRACTOMETER

Procedure : Put the drop of oil on butyro refractometer and note down the reading = 48.5

48.5 is the oil sample's reading which is in the normal range.

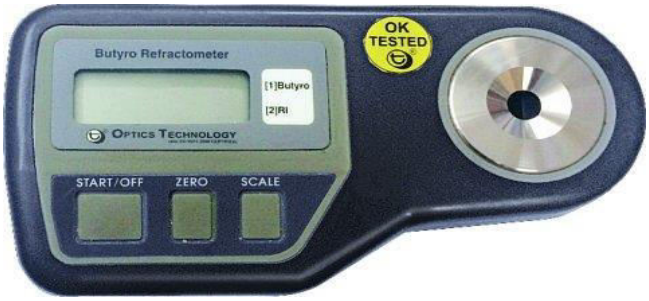
b)refractive index

aim :this test is performed to determine the refractive index of sample.

Instrument : : BUTYRO REFRACTOMETER

Procedure :Put the drop of oil on butyro refractometer and note down the reading =1.4583

- 1.4583 is the oil sample's reading which is in the normal range.



(fig.2 butyro refractometer)

c) Total polar material :

Aim : this test is performed to do the analysis of total polar material present in sample or to measure them.

Instrument :TPM Analyser

Procedure :take 20 ml of oil sample and put the sample on hot plate to boil the sample till the sample's temprature reaches to 40 -50 °C.

As temprature reaches to 40 -50 °C take the TPM analyser and deep it into a sample note down the reading : 10.0 % TPM

10.0 % TPM is in the normal range

D) free fatty acis

aim :this test determines the free fats present in the sample .it is the titration method .

method : titration

Procedure : take 30ml 95% ethanol

Add phenophthelein indicator

0.1N Naoh till colour changes to pink

Add 10g oil sample

Heat it

Add phenophthelein indicator

Solution becomes colour less

Titrate wit 0.1 N NaoH till colour changes to pink

Note down burette reading =0.1

Calculation :

FFA = Burette Reading ×0.1 N NaoH ×28.2

Weight of sample

$$= \frac{0.1 \times 0.1 \times 28.2}{10.150}$$

$=0.0279$

e)Peroxide value

Aim : it determies the value of H_2O_2 present in oil.

Method : titration

Procedure : take 5g oil

⬇

Add 12ml chloroform +18ml acetic acid (2:3)

⬇

Add 0.5ml KI saturated

⬇

Put the sample in dark room

⬇

Add 30ml water

⬇

Add starch indicator (solution becomes violet coloured)

⬇

Titrate with 0.01N $Na_2S_2O_8$ (Sodium thiosulphate)

Till colour changes to colourless.

Note down the reading =0.45

PV = Burette Reading ×0.01N KI ×1000

Weight of sample

$$PV = \frac{0.45 \times 0.01 \times 1000}{0.9}$$

PV = 0.9 meq/kg

f)Fat analysis

aim : to measure the amount of the fat present in sample (namkeen –aloosev)

instrument : oil analyser

(fig.3 fat analyser)

procedure : take empty beaker and weight it

weight of beaker =921g

take the 2g namkeen (sample) and put sample in whattman thimble

⬇

fill the empty beaker with 100ml petrolium ether and then put the thimble in that beaker

⬇

put that beaker on hot plate in oil analyser instrument ,open all the nobes ,set the temprature at 120 °C at 1 Hour.

⬇

After 1hr cycle set the 180 °C temp. for 1 hr and close all the nobes .

⬇

During the cycle after approximately 20 mins open all the nobes - as ether reaches down colse the nobes again .

⬇

Let the all ether evoporate , as 180 °C 1 hr cucle completes and after evoporation of ether take that beaker and put that in hot air oven for 1 and half hour

⬇

then put that beaker in desicator

⬇

weight the beaker again and note down the post weight ,

calculation :

A = pre weight – post weight

$$\text{Fat analysis} = \frac{A \times 100}{\text{Weight if sample}}$$

Fat analysis of aloosev is = 41.23 % which is normal .

3)Microbiological analysis :

a) Total aerobic count :

media : plate count agar

Buffer peptone water(BPW) as a pre enrichment media

Dilution tubes : 0.1% peptone solution

for sample stock :

25g aloosev (crushed) +225 ml BPW

Mix gentally

Take 1ml from that and add in 2 labbled tube which is our 2nd dilution tube .and do the dilition to 10^{-4}.

Take the agar and by pour plate method add the sample and pour the tpc agar in respective plates.

Put the plates at 37 °C for 48 hours .

After 48 hours take the plates and observe the it

Calculation :

$$\sum x = \frac{\sum c}{N1 + (0.1N2) \times \text{Dilution factor}}$$

b)yeast and molds :

media : chloramphenicol yeast glucose agar

Buffer peptone water(BPW) as a pre enrichment media

Dilution tubes : 0.1% peptone solution

Ffor sample stock :

25g aloosev (crushed) +225 ml BPW

Mix gentally

Take 1ml from that and add in 2 labbled tube which is our 2^{nd} dilution tube .and do the dilition to 10^{-4}.

Take the agar and by pour plate method add the sample and pour the chloramphenicolyeast glucose agar in respective plates.

Incubation : put the plates at 25 °C for 72 hours.

Observation : take the plates and count the colony ,and note down it.

d) Coliforms

media : violet red bile agar

Buffer peptone water(BPW) as a pre enrichment media

Dilution tubes : 0.1% peptone solution

for sample stock :

25g aloosev (crushed) +225 ml BPW

Mix gentally

Take 1ml from that and add in 2 labbled tube which is our 2^{nd} dilution tube .and do the dilition to 10^{-4}.

Take the agar and by pour plate method add the sample and pour the VRBL agar in respective plates.

Incubation : put the plates at 37 °C for the 48 hours.

Observation : after 48 hurs take the plates and observe the pink coloured colony .

e) Escherichia coli

media : eosin methelene blue

Buffer peptone water(BPW) as a pre enrichment media

Dilution tubes : 0.1% peptone solution

for sample stock :

25g aloosev (crushed) +225 ml BPW

Mix gentally

Take 1ml from that and add in 2 labbled tube which is our 2^{nd} dilution tube .and do the dilition to 10^{-4}.

Take the plates pour the eosin methelene blue agar in it .

Put te plates at 37°C for 24 hours .

After 24 hours take the plates and do the striecking of sample in the respective eosin methelene blue agar plates.

Put the plates in incubation for 24 hours .

Observation :note down the green metallic shine coloured colony .

If green metallic shine coloured colony is present so do the biochemical conformative test .

Indole test : take the tryptophan broth and inoculate the colony in it .

Put the tubes at 37 °Cfor 24 hours incubation .

After 24 hours take the tubes and add the kovac's reagent in the broth ,by adding kovac's reagent it shows a pink coloured ring so the presence of ring indicated the E.coli present in the sample.

f) Salmonella

media : XLD (xylose lysine deoxycholate)

Buffer peptone water(BPW) as a pre enrichment media

Dilution tubes : 0.1% peptone solution

for sample stock :

25g aloosev (crushed) +225 ml BPW

Mix gentally

Take 1ml from that and add in 2 labbled tube which is our 2^{nd} dilution tube .and do the dilition to 10^{-4}.

Take the plates and pour the xld agar in it. Put the plates I the incubator for the 24 hours

Take the 0.1ml sample and inoculate the in the RV (rappapor - vssalian) media -incubate it for 24 hours for 37 °C .

After 24 hours from RV and take the loopful culture and strieck it in the XLD agar .

Incubate the tubes at 37 °C for 24 hours .

After 24 hours observe the plates :

Observation: red colony with black coloures center

If the positive colony then do the conformative test .

Take the TSI (triple sugar agar) & LIA(lysine ion agar) slant for the conformative test.

Strieck the sample form XLD agar on the TSI and LIA slant .

Incubate the slant for the24 hours at 37 °C.

- TSI slant :

slant :red colourd

butt : yellow coloured

if H_2S gas is present so bubble observed at bottom.

- LIA slant :

Slant : purple coloured

Butt : purple coloured

if H_2S gas is present so bubble observed at bottom.

For the conformative test ==

1) Urea utilization broth :pick the colony from the TSIslant and inoculate it in the urea utilization broth and incubate for the 24 hours at 37 °C .

-NEGATIVE (no colour change the yellow colour broth)

2)TRYPTONE BROTH

3)MR –VP MEDIUM

4) KCN BROTH

5)PHENOL RED LACTOSE BROTH

6)PHENOL RED SUCROSEBROTH

7)PHENOL RED DULATOL BROTH

8)MALONATE BROTH

9)HISALMONELLA LATEX TEST KIT

OTHER TEST

- **Water analysis :**

1)TDS (total dissolved solids) -TDS is the term used to describe the inorganic salts and the trace amount of organic mater present in water.

Procedure : take 200ml of water

then add the tds road and dip ir into water

then let theTDS meter set and note down the reading

2) HARDNESS :Hardness id describes as high amount of naturally containing dissolved calcium and magnesium.

Procedure : take 50ml sample +1ml buffer +EBT (erichrome black T)indicator

Then titrate it with EDTA untilsteel blue colour disappears

Then note down the reading .

- **Milk analysis :**

1) fat % :
   fat percent analysis,determines the level of fat in milk.
   Gerber method is used .
   Procedure : take 90% 10ml H_2SO_4 AND 10.75ml milk.
   Then add 1 to 2ml isoamyl alcohol
   Mix until it turns black
   Then centrifuge it for 5 mins.
   After centrifuge yellow colour fat seprated and observed at the top of gerber tube.

2)LR

(Fig.4 Gerber tube)

- **Food adultrant :**

1) To determine the sudam dye : 1gm chili powder +hexane –let the solution settle down then take the top of tube in other test tube then add the aceto nitrile =if bottom becomes red colour means test is positive.

2)To determine the metanil colour :

I.) Take pinch of besan +3ml alcohol +HCl 2 drops = if solution becomes pink means metanil colour is present
II.) Turmeric pinch of +HCl –solution becomes pink then add water if by adding water if the pink colour disappears. Means metail colour present

3)To determine the artificial colour : Take 1 glass water and sprinkle the chili or any sample in it if water becomes coloured means artificial colour is present.

Results & Discussion:

PHYSICAL ANALYSIS

1) Motisture of namkeen (aloosev) :

Sample = 1.25% in 2min 30 sec ,Normal range = 1.00-1.60%

CHEMICAL ANALYSIS

1.Butyro reading : Refractometer reading = 48.5

48.5 is the oil sample's reading which is in the normal range.

2.Refrective index

refractometer reading=1.4583

1.4583 is the oil sample's reading which is in the normal range.

3. TPM

reading : 10.0 % TPM

10.0 % TPM is in the normal range

4.FFA

$$\text{FFA} = \frac{\text{Burette Reading} \times 0.1\ \text{N NaoH} \times 28.2}{\text{Weight of sample}}$$

=0.0279

5. Peroxide value

$$\text{PV} = \frac{\text{Burette Reading} \times 0.01\text{N KI} \times 1000}{\text{Weight of sample}}$$

PV = 0.9 meq/kg

6 . Fat analysis

A = pre weight – post weight

Fat analysis = A ×100

Weight if sample

Fat analysis of aloosev is = 41.23 %

Microbiological analysis

1.Total aerobic count :

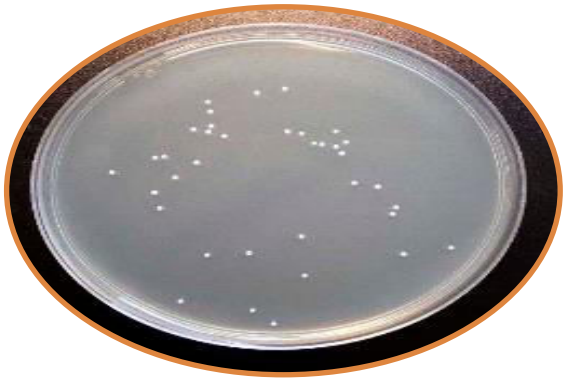
Calculation:

∑x = ∑c

N1 + (0.1N2) ×Dilution factor

In sample p1 +p2 +p3 total 108 colonies were present .

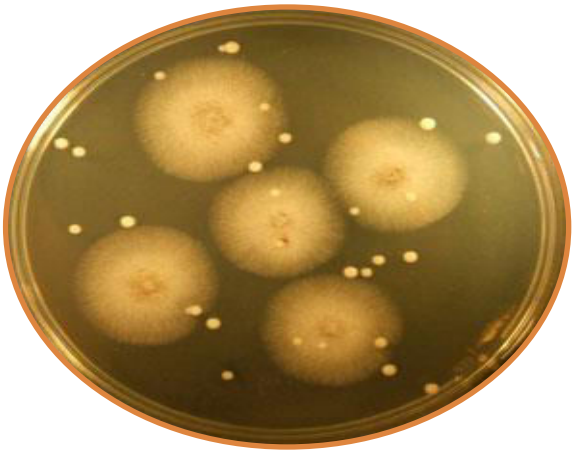
so, 981.81 cfu//gm



(Fig.5 result of tpc)

2)Yeast & molds :

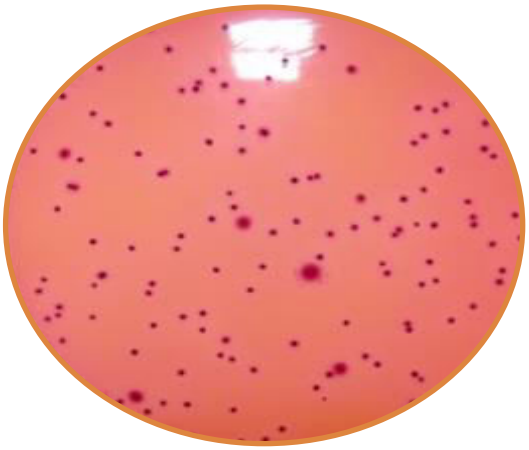
34 colonies were present ,which is in the range



(fig .6 result of y & m)

3) Coli forms:

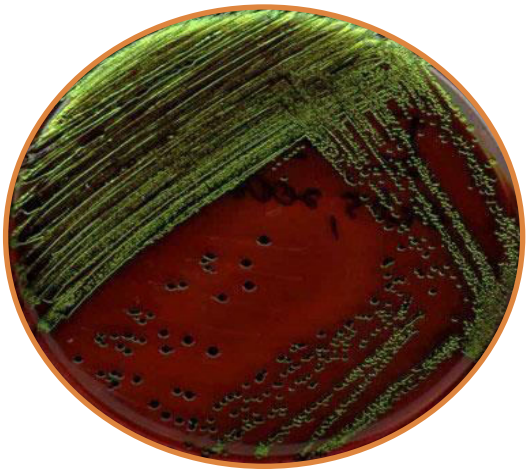
45 colonies were present, which is in the range



(fig.7 result of coloforms)

4)E.Coli :

Absent



(Fig.8 result of E.coli

5*) Salmonella:*

Absent

- **water analysis**

TDS : value should be <150 =30

Hardness = 30

- **Milk analysis** =5.5

- **Food adultration**

1)To determine the sudam dye - Negative

2) To determine the artificial colour - Negative

3)To determine the Metanil colour - Negative

Conclusion:

By performing the qualitative ,physical chemical & microbiological analysis of namkeen products I can conclude that the given sample of namkeen is appropriate for human consumption .after working in balaji wafer company as a training , I have learnt the analysis of namkeen product quality and all the aspects of quality analysis it's a very useful experience.

REFRENCE:

All the test protocol and procedure are the standard operating procedures of the balaji wafer pvt.ltd.

All the photographs are the original result of the performed test of the project under the guidelines of head of the department of microbiology Dr. rachna joshi .