Optimization Formulation Cheese Spreadable Analogue to Characteristic of Organoleptic and Chemistry Uses Response Surface Methodology

by Yudi Garnida -

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A SENSITIVE SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF MANEBWITH 1-(2'-PYRIDYLAZO)-2-NAPHTHOL USING CHITIN AS AN ADSORBENT

S.K.Mehta

RJC, 9(4),603-607, 2016

Keywords: Maneb, spectrophotometric, DMF, PAN

15

WATER QUALITY ANALYSIS USING GIS INTERPOLATION METHOD IN SERTHALAIKADU LAGOON, EAST COAST OF 15 DIA

R. Nagalakshmi, K. Prasanna & S. Prakash Chandar

RJC, 9(4),634-640, 2016

Keywords: Lagoon, interpolation, chlorophyll-a, suspended sediments, salt pan, aquaculture, mapping.

SYNTHESIS AND CHARACTERIZATION OF HYDROXYAPATITE-GELATIN COMPOSITES WITH IN- SITU AND EX-SITU WET PRECIPITATION

S. Monica, Charlena and I. H. Suparto

RJC, 9(4),650-656, 2016

Keywords: Bellamya javanica, ex-situ, gelatin, hydroxyapatite, in-situ

A CONVENIENT SYNTHETIC PROTOCOL FOR THE SYNTHESIS OF 2, 3-DISUBSTITUTED 1, 4-BENZOTHIAZINES

M.R. Sangvikar , G.M.Phadnaik , M.R. Bhosle , D.V. Mane & R. A. Mane.

RJC, 9(4),686-691, 2016

Keywords: 1, 4-Benzothiazines; M-CPBA; 2-IBX.

11

SYNTHESIS AND CHARACTERIZATION OF CITRATE CAPPED GOLD NANOPARTICLES AND THEIR EFFECT ON LIQUID CRYSTALS: OPTICAL STUDIES

M. Tejaswi , M.C. Rao , P.V. Datta Prasad , G. Giridhar, V.G.K.M. Pisipti & R.K.N.R. Manepalli

RJC, 9(4),697-705, 2016

Keywords: Synthesis, POM, DSC, Nano-dispersion, XRD, SEM, UV and Birefringence.

STUDY ON THE STRENGTH PROPERTIES OF MARINE ALGAE CONCRETE

R. Ramasubramani, R. Praveenand & K.S.Sathyanarayanan

RJC, 9(4),706-715, 2016

Keywords: Marine brown algae, compression test, spilt tensile, Flexure, E-value.

INHIBITORY ACTION OF THEOBROMA CACAO PEELS EXTRACT ON CORROSION OF MILD STEEL IN DIFFERENT MEDIA
Yuli Yetri1, Emriadi, Novesar Jamarun & Gunawarman
RJC, 9(4),716-727, 2016
Keywords: Theobroma cacao peels, Mild steel, Corrosion inhibition, GC-MS.

SYNTHESIS OF CERTAIN BENZIMIDAZOLOQUINOLONE CARBOXYLIC DERIVATIVES AS POTENTIAL ANTITUBERCULAR AGENTS
A. Mohana Rao, T. Ashok Kumar & B. Rama Devi
RJC, 9(4),745-750, 2016
Keywords: 4-nitro-o-phenylenediamine, benzimidazole, ethoxymethylene malonic acid ester, antitubercular activity.

THE ELECTROSTATIC PROPERTIES OF 1,2-DIMETHYL-3- NITROBENZENE COMPOUND: AB INITIO CALCULATION AND X-RAY CHARGE DENSITY ANALYSIS
N. Boubegra, Y. Megrouss, N. Boukabcha, A. Chouaih & F. Hamzaoui
RJC, 9(4),751-761, 2016
Keywords: molecular structure, multipolar refinement, hydrogen bonding, thermal motion, dipole moment

OPTIMIZATION FORMULATION CHEESE SPREADABLE ANALOGUE TO CHARACTERISTIC OF ORGANOLEPTIC AND CHEMISTRY USES RESPONSE SURFACE METHODOLOGY
Yudi Garnida, Yusman Taufik & Tantan Widiantara
RJC, 9(4),762-768, 2016
Keywords: spreadable analogue cheese, cheese, optimization.

AN EFFICIENT GRINDSTONE TECHNIQUE FOR ELECTROPHILIC THIOCYANATION OF AROMATIC AND HETEROAROMATIC COMPOUNDS USING THIOCYANATE IN PRESENCE OF ICL /KHSO4AND KIO4/KHSO4
Y. Hemanth Sriram, K. C. Rajanna, M. Satish Kumar, M. Venkateswarlu & R. Madhusudan Raju
RJC, 9(4),769-778, 2016
Keywords: Potassium metaperiodate; Potassium bisulfate; Iodine mono chloride, Ammonium thiocyanate; Selective thiocyanation; Grindstone technique; rate accelerations.

GC-FID ASSESEMENT OF RESIDUAL SOLVENTS PRESENT IN ADDITIVE-POLYSORBATE-80
P.D. Anumolu, C.H. Rajesh, L. Vamsi Krishna, A. Radha Gayathri, G. Mounika & G. Sunitha
RJC, 9(4),779-787, 2016
Keywords: Polysorbate-80, GC, FID, residual solvents

SYNTHESIS AND STUDY OF CALCINATION TEMPERATURE INFLUENCE ON THE CHANGE OF STRUCTURAL PROPERTIES OF THE LTA ZEOLITE
K. Menad, A. Feddag and K. Rubenis
RJC, 9(4),788-797, 2016
Keywords: Calcination, LTA zeolite, Micro-pores, Porous volume, Surface area.

2015 FLOOD ASSESSMENT IN KANCHIPURAM DISTRICT OF TAMILNADU USING GIS
R. Nagalakshmi & K. Prasanna
RJC, 9(4),798-805, 2016
Keywords: El-Nino, GIS, Interpolation, low lying area, rain gauge station, hose hold survey and questionnaire

SYNTHESIS, CHARACTERIZATION AND APPLICATION OF PHENOL-FORMALDEHYDE RESIN BLENDED WITH SULPHONATED SAPINDUS MUKOROSSI KAERTN CARBON
M.Thenmozhi, M. Karpagavalli & R.K.Seenivasan
RJC, 9(4),849-857, 2016

Keywords: Phenol formaldehyde Resin, Sulphonated Sapindus mukorossi KAERTN Carbon, Cation Exchange Capacity, Composite resin, low cost ion exchangers

SEASONAL VARIATIONS IN PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER COLLECTED FROM KONDAPALLI SANTHI NAGAR NEAR VIJAYAWADA THERMAL POWER PLANT (VTPS)

T. Bhagya Kumar, O. Sailaja, K. Kiran Kumar & G. Krishnaveni

RJC, 9(4),858-863, 2016

Keywords: VTPS, Santhi Nagar, Physico-chemical properties, Heavy metals

THE REDUCED REDLICH-KISTER EQUATIONS FOR CORRELATING EXCESS PROPERTIES OF 1,2- DIMETHOXYETHANE + WATER BINARY MIXTURES AT TEMPERATURES FROM 303.15 K TO 323.15 K.

H. Salhi, Shaik. Babu, A. A. Al-Arfaj, M. A. Alkhaldi, N. O. Alzamel, S. Akhtar & N. Ouerfelli

RJC, 9(4),864-877, 2016

Keywords: Binary liquid mixture, viscosity, Reduced Redlich-Kister equation, Molecular interaction, 1,2 dimethoxyethane

DEVELOPMENT AND VALIDATION OF AN HPLC-UV METHOD FOR THE DETERMINATION OF RALOXIFENE AND RELATED PRODUCTS (IMPURITIES)

Phani R.S. Ch, Useni Reddy Mallu, K. R. S. Prasad & MastnaiahT

RJC, 9(4),878-888, 2016

Keywords: Raloxifene, Degradation studies, HPLC, Osteoporosis, Method development and validation.

THE EFFECT OF DRYING TEMPERATURE ON THE ANTIOXIDANT ACTIVITY OF BLACK MULBERRY LEAF TEA (morus nigra)

Yusman Taufik,Tantan Widiantara & Yudi Garnida

RJC, 9(4),889-895, 2016

Keywords: black mulberry leaves, drying temperature, antioxidant

SYNTHESIS AND BIOLOGICAL INVESTIGATION OF 3,3,6,6-TETRAMETHYL-9-STYRYL-1,8-DIOXOOCTAHYDRO-XANTHENE PROMOTED BY Fe_3O_4-SUPPORTED CITRIC ACID AS A MAGNETICALLY RECOVERABLE CATALYST

A. H. Cahyana, D. Pratiwi & B. Ardiansah

RJC, 9(4),896-902, 2016

Keywords: magnetite, dioxooctahydroxanthene, citric acid, antioxidative, antibacterial

HORN SNAIL (*Telescopium*sp) AND MUD CRAB (*Scylla*sp) SHELLS POWDERAS LOW COST ADSORBENTS FOR REMOVAL OF Cu^{2+}FROM SYNTHETIC WASTEWATER

H. Darmokoesoemo, F.R. Setianingsih, T.W.L.C. Putranto & H.S.Kusuma

RJC, 9(4), 550-555, 2016

Keywords: Adsorption capacity of Cu2+, Horn snail (Telescopium sp.),Mud crab (Scylla sp.),Shell powder, FT-IR analysis, SEM-EDX analysis.

INFLUENCE OF Fe_3O_4 NANOPARTICLES DISPERSED IN LIQUID CRYSTALLINE COMPOUNDS: SPECTROSCOPIC CHARACTERIZATION

J.Sivasri, M.C.Rao,G.Giridhar, T.P.Madhav4, T.E.Divakar & R. K.N.R. Manepalli

RJC, 9(4), 556-565, 2016

Keywords: Synthesis, POM, DSC, Nano-dispersion, XRD, FTIR and SEM.

ASSESSMENT OF VASPIN AND RISK FACTORS IN RELATION WITH DIABETIC MELLITUS TYPE II

Arshad Noori Al-Dujaili, Adhraa Baqir Hassan & Najlaa Saleh Mahdi

RJC, 9(4), 566-572, 2016

Keywords: diabetes mellitus, Risk Factors and Vaspin.

STABILITY INDICATING METHOD FOR THE VALIDATION OFRIBOFLAVIN IN DOSAGE FORMS

B.V. Ramesh
RJC, 9(4), 573-581, 2016
Keywords: Validation Method, Wavelength, Specificity, System Suitability, Linearity, Accuracy and Method Precision.

GREEN CHEMISTRY: AN ECO-COMPATIBLE APPROACH FOR NANODROP SPECTROPHOTOMETRIC DETERMINATIONOF AMITRIPTYLINE IN PURE AND PHARMACEUTICAL DOSAGE FORMS
Pratik Kumar Jagtap, KavitaTapadia
RJC, 9(4), 582-587, 2016
Keywords: Pharmaceuticals, Tricyclic anti-depressants, Amitriptyline, Nanodrop spectrophotometer; Green-technology.

SYNTHESIS AND CHARACTERIZATION OF SCHIFF BASE LIQUID CRYSTALS WITH DISPERSED ZNONANOPARTICLES-OPTICAL PROPERTIES
P.Jayaprada, M. Tejaswi, Giridhar ,M.C.Rao,V.G.K.M. Pisipati & R.K.N.R Manepalli
RJC, 9(4), 588-596, 2016
Keywords: Synthesis, POM, DSC, Nano dispersion, UV, XRD, SEM and FTIR.

ANALYSIS OF QUANTUM AND ENERGETIC EFFICIENCY IN SOLAR CELLS BY MODIFYING THE DIFFUSION DOPING METHOD
J.A. Mora, D. Amaya & O. Ramos
RJC, 9(4), 597-602, 2016
Keywords: Renewable Energy, Solar Energy Efficiency, Multilayer Solar Cells, Semiconductor, PC1D, Air Mass 1.5, Quantum Efficiency, Diffusion length, Doping.

PREPARATION OF COMPOSITE MEMBRANES BASED ON SULFONATED POLYSULFONE AND ACTIVATED CARBON
Irfan Gustian, Asdim & Evi Maryanti
RJC, 9(4), 608-613, 2016
Keywords: Composite, membranes, sulfonated polysulfone, activated carbon, conductivity.

SYNTHESIS, SPECTROSCOPIC AND MOLECULAR STUDIES OF LEAD(II) COMPLEXES OF SCHIFF BASES DERIVED FROM 4-METHOXYBENZALDEHYDE AND AMINO ACIDS
Sunita Bhanuka & Har Lal Singh
RJC, 9(4), 614-626, 2016
Keywords: amino acids, lead(II) complexes, Schiff base, spectroscopic studies, DFT calculations, antibacterial activities.

CHEMICAL ANALYSIS OF GROUND WATER OF BOLPUR BLOCK, BIRBHUM, WEST BENGAL, INDIA
Sakuntala Chakrabarti & Pulak Kumar Patra
RJC, 9(4), 627-633, 2016
Keywords: Chemical analysis, ground water quality, Bolpur block, Birbhum district, West Bengal, India.

EXPERIMENTAL AND THEORETICAL STUDIES OF SPEED OF SOUND AND VISCOSITY IN SOME LIQUID MIXTURES OF METHYL BENZOATE: A COMPARATIVE STUDY
Sk. Suriya Shihab, Shaik. Babu & S. Sreehari Sastry
RJC, 9(4), 6[illegible]-649, 2016
Keywords: Speed of sound, viscosity, liquid mixtures, alkanols, methyl benzoate.

DEVELOPMENT OF NEW GAS CHROMATOGRAPHY/MASS SPECTROMETRY PROCEDURE FOR THE DETERMINATION OF HEXAHYDROPHTHALICANHYDRIDE IN UNSATURATED POLYESTER RESINS
S. Dugheri1, A. Bonari, I. Pompilio,N. Mucci, M. Montalti & G. Arcangeli
RJC, 9(4), 657-666, 2016

Keywords: Trimethyloxonium tetrafluoroborate, Hexahydrophthalic anhydride, unsaturated polyester resins, Gas chromatography, Solid phase microextraction.

SYNTHESIS, CHARACTERIZATION AND CRYSTAL STRUCTURE OF 2-(4- (BENZYLOXY) PHENYL)-4, 5- DIPHENYL-1H-IMIDAZOLE

D.K. Sharma, A. Jayashree, B. Narayana, B.K. Sarojini, S. Anthal & R. Kant

RJC, 9(4), 667-672, 2016

Keywords: Imidazole, Crystal Structure, Direct Method, Intermolecular interaction.

ANALYSIS OF FATTY ACID AND AMINO ACID PROFILE OF "METI" MUSSELS (Batissa violacea L. von Lamarck, 1818) IN LA'A RIVER OF PETASIA DISTRICT NORTH MOROWALI REGENCY

Jamaluddin, Mappiratu, Septiawan & Yonelian Yuyun

RJC, 9(4), 673-679, 2016

Keywords: Molluscs, proximate analysis, nutrient content

TELESCOPE SNAIL (Telescopium sp) AND MANGROVE CRAB (Scylla sp) AS ADSORBENT FOR THE REMOVAL OF Pb 2+ FROM AQUEOUS SOLUTIONS

H. Darmokoesoemo, Magdhalena , T.W.L.C. Putranto & H.S. Kusuma

RJC, 9(4), 680-685, 2016

Keywords: Adsorption capacity, equilibrium adsorption time, Pb 2+ , Scylla sp., Telescopium sp.

EFFECT OF MULTIPLE INJECTION STRATEGIES TO REDUCE OXIDES OF NITROGEN AND CONTROL OF POLLUTANT EMISSIONS OF AN AUTOMOBILE

S. Sendilvelan & K. Bhaskar

RJC, 9(4), 692-696, 2016

Keywords: Combustion Chemistry, Zeldovich Mechanism, Oxides of Nitrogen, Turbulence Technique, Diesel Engine.

AN EFFICIENT SYNTHESIS OF POTENT ANTI-TUBERCULAR DRUG CANDIDATE BM212

Namita A. More, Manoj D. Patil, Dinesh R. Garud & Jayant M. Gajbhiye

RJC, 9(4),806-811 2016

Keywords: Anti-tubercular, BM212, Paal-Knorr synthesis.

NON-CONVENTIONAL ADSORBENT PREPARED FROM Wrightiatinctoria FRUITS UNDER MICROWAVE HEATING FOR THE REMOVAL OF Ni(II) IONS

S. Saminathan, M. Asaithambi, V. Sivakumar and P. Sivakumar

RJC, 9(4), 812-824, 2016

Keywords: Microwave heating, Surface area, Adsorption, Kinetics, Isotherm and Heavy metal.

GEOSPATIAL MAPPING OF URBANIZATION INDUCED PRE AND POST-MONSOON WATER QUALITY FOR KATTANKOLATHUR BLOCK OF TAMIL NADU STATE (INDIA)

Sachikanta Nanda and R. Annadurai

RJC, 9(4), 825-841, 2016

Keywords: Groundwater, Water Quality, Sampling, Physico-chemical Parameters, Spatial Distribution

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SYNTHESIS AND CHARACTERISATION OF POLYTHIOPHENE AND TiO_2 DOPED POLYTHIOPHENE THIN FILMS BY CHEMICAL BATH DEPOSITION.

R.S.Futane,V. M. Raut and S.D.Dhande

RJC, 9(4), 842-848, 2016

Keywords: Polythiophene ,TiO2 ,chemical bath deposition, morphology.

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OPTIMIZATION FORMULATION CHEESE SPREADABLE ANALOGUE TO CHARACTERISTIC OF ORGANOLEPTIC AND CHEMISTRY USES RESPONSE SURFACE METHODOLOGY

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ABSTRACT

The purpose this research is to characteristic (flavor, texture, and odor) of Spreadable Analogue Cheese product by the substitution of Edam cheese and Cheddar cheese, and also addition of Soy Protein Isolate. Beside, this research is also to determine the best formulation of Spreadable Analogue Cheese process making using the Design Expert Application with Response Surface Methodology method Central Composite. This research was done within two phases. The preliminary phase is to determine the objective function, dependent and independent variables in the process of Spreadable Analogue Cheese making which are put in the application. The application generates the desired sensory and chemical characteristics. The second phase is to determine the best formulation of Spreadable Analogue Cheese. The response in this research are chemical responses (including amino acids, fatty acids, and moisture content analysis), physical response (including viscosity), and sensory response (including aroma, flavor, texture). The responses results are 0.84% for fatty acids, 0.19% for amino acids, 47.64% for moisture context, 385.44 d.pas for viscosity, 3.97 for aroma attribute, 3.64 for flavor attribute, and 3.95 for texture attribute.

Keywords: spreadable analogue cheese, cheese, optimization.

INTRODUCTION

Cheese is one form of solid dairy products that require fermentation in the manufacturing process. The cheese has been consumed in Asia several thousand years ago and many ancient writings contain references that transform milk into cheese ace a method of preservation[8].

At present, although the cheese was consumed only above a certain economic level, but the last few years, demand for dairy products is quite large. In 1998, consumption of cheese reached 1.094.333 sinks, which from this amount of cheese produced in the country of about 34. 976 sinks, while the rest is met by imports.

Processed cheese of cheese that is made by mixing and destroying the natural cheese accompanied by heating, so ace to produce a uniform product and supple. Additional food ingredients commonly used in the manufacture of processed cheese emulsifying salts, dyes, water, and flavor[7].

Natural cheese type most used in the manufacture of processed cheese in Indonesia is the cheddar cheese, so often called Cheddar cheese processed. The shape also vary from block, slice, and sauce to spreadable[5].

Cheese market demand is increasing, but the increase in demand is note directly proportional to the selling price in the market. Processed cheese is still one imported product then there must be a response to the phenomenon that occurs above, this can be realized by making a cheese analogue which has the same characteristics both from organoleptic and chemical properties of the original cheese.

Analogue cheese was first introduced in the United States in the early 1970-an. Making cheese analogue of various natural cheeses (eg, Cheddar, Monterey Jack, Mozzarella, Parmesan, Romano, Blue and Cream). Of the several types of cheese that is often used is the cheddar cheese and mozzarella.

Problems in the manufacture of cheese analogues, especially for Cheese Spreadable Analogue is to determine the mix of types of cheese and concentration of cheese used ace a filler to meet a protein source, a filler in the manufacture of cheese analogue usually using cornstarch, potato starch, rice flour, wheat flour, carrageenan and gelatine[4].

This using Response Surface Methodology (RSM) that is used to help optimize the product or process. Then using the method Central Composite Design (CCD) in order to find the right results. This program has the advantage compared to other programs such ace for example the program that this program will optimize the processes included in the manufacturing process Spreadable Cheese Analogue with some variables expressed in units of the response. Experimental CCD is a design consisting of a 2k factorial design with center added a couple of runs and axial run.

EXPERIMENTAL

The materials used in this are the ingredients for the manufacture Spreadable Cheese Analogue and materials for the chemical response analysis. The materials used to manufacture Spreadable Cheese Analogue is Edam Cheese and Cheddar Cheese, Soy Protein Isolate, cornstarch, Vegetable Oil, Salt, Emulsifier (Trisodium Citrate, Disodium Phosphate), Acetic Acid.

The materials used for chemical analysis is distilled water, salt Kjeldahl, a solution of concentrated H_2SO_4, 30% NaOH solution, Na_2SO_4 solution, boiling stones, granules Zn, raw HCl solution, phenolptalein, N-hexane, alcohol and solution Baffer.

The tools used in this are the ingredients for the manufacture Spreadable Cheese Analogue and materials for chemical analysis. The tools used to manufacture Spreadable Cheese Analogue namely the scale, spoons, knives, slicer, spatula, mixers, hand blander.

The tools used for chemical analysis is erlenmeyer flask 100 ml, flask, rod stirrer, pipette volumetric, pipette, digital balance of, tool reflux, filter paper, beakers, funnels, flask, pumpkin Kjeldahl, stove, adapters, distillation equipment, the stand, clamps, burettes, reading copy bags, yarn mattress, sokhlet, stove, bath, pumpkin round bases, oven, and eksikator, pH metre.

Experimental Response Surface Methodology designs Central Composite Design methods that will be used.

Table-1: Determination of Design of Experiments CCD pts

	Unit	-alpha	-1	0	1	+alpha
Edam	%	0	5	10	15	20
Cheddar	%	0	5	10	15	20
ISP	%	-5	0	5	10	15
cornstarch	%	-5	0	5	10	15

A middle value (0) default is the value and the average value of (-1) and (+1) for each factor. Due to the number of factors in this variable is the fourth factor, the value of a = vk = v4 = 2. Ace for the actual alpha is calculated by the equations:

$$-\text{alpha} = (0) - a\,[\,(0) - (-1)\,]$$
$$+\text{alpha} = (0) + a\,[\,(0) - (-1)\,]$$

The entire formulation of raw materials and excipients ace well ace the addition of other ingredients variables calculated using dependent ace significant balance, including moisture content, fat content, amino acid , and viscosity, appearance Test against aroma, flavor, and texture in each formulation. Results of the analysis incorporated will be into the data program table methods Response Surface Methodology Central Composite Design.

RESULTS AND DISCUSSION

Fat Content

Estimated coefficient is the coefficient of each of these factors in the equation conded ace follows:

Fat Content = 28.65 + 1.05A + 1.98B + 0.46C + 0.25D + 0.36AB + 0.55AC - 0.16AD – 0.16BC + 0.55BD + 0.36CD – 0.005A^2 - 0.04B^2 - 0.27C^2 – 0.090D^2

Optimal Graph formulations based di atas the response levels of fat can be seen in the picture:

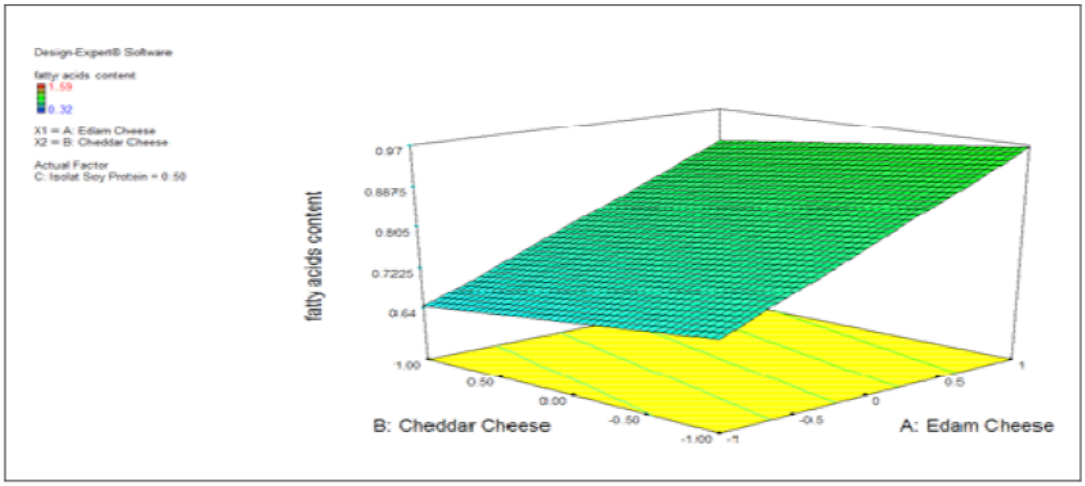

Fig.-1: Formulation Based Optimal Response fat content

Graph above show optimal formulation bases response level of fat, level of fat that predicted by this graph as high as 28.6506% where boundary under level of fat from entire formulation that is 22.7272% and upper limit as high as 32.582%. To reach value of level of fat is matching with the one which predicted by program at product Cheese Spreadable Analogue must uses Edam Cheese 10% and Cheddar Cheese 10% as the value X1 and X2 and Isolate Soy Protein 5%, cornstarch 5% as the actual factor, where X1 and X2 and second actual factor is variable changes.

Addition of filler materials can degrade level of cheese fat process, at product Cheese Spreadable Analogue filler materials Isolate Soy Protein and cornstarch more and more its use then level of fat will be growing downhill. This condition because more and more usage Isolate Soy Protein then product Cheese Spreadable Analogue that produced by will have level of high protein whereas more and more addition of filler materials Cornstarch then extract content more and more and level of fat growing downhill, content of vegetation fat from cornstarch by itself gyrate 3.59% while carbohydrate is biggest component that is 76.89%. Base this condition then will cause level of cheese fat Cheese Spreadable Analogue growing downhill.

Moisture Content

Base tables ANAVA model RSM level of water Cheese Spreadable Analogue, A state Edam Cheese, B state Cheddar Cheese, C state Isolatee Soy Protein and D cornstarch. Term that consist of one letter named single variable states linear effect whereas term that consist of two letters named two variables that state interaction effect.

Base ANAVA are referred as existed some terms that have significant influence to level of water Cheese Spreadable Analogue and there is also term that has no significant influence to level of water Cheese Spreadable Analogue. As for that have an effect on significant to level of water is term linear Edam Cheese, term linear Cheddar Cheese, terms linear Isolate Soy Protein and term linear cornstarch. Whereas term two variable and interaction effects not give significant influence to response produced and to know influence picture that given from each term referred, then must see coefficient estimation from each term.

Coefficient estimation that is coefficient of each factor that existed in equation conducted as follows-

Moisture Content = 51.37 – 3.29A – 3.67B - 5.23C - 3.83D – 0.61AB - 0.31AC + 0.65AD + 0.65BC - 0.31BD – 0.61CD + $0.061A^2 + 0.061B^2 + 0.32C2 – 0.22D^2$

Optimal Graph formulations based the response moisture content can be seen in the picture:

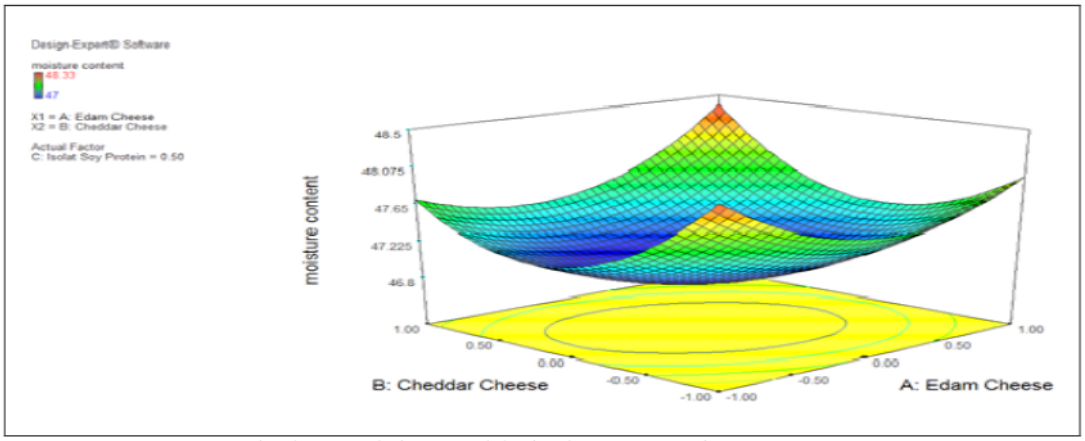

Fig.-2: Formulation Based Optimal Response moisture content

Graph above show optimal formulation bases response level of water, level of water that predicted is 51.3661% where boundary under level of water from entire formulation that is 35.6795% and upper limit as high as 67.445%. To reach value of level of water is matching with the one which predicted by program at product Cheese Spreadable Analogue must uses Edam Cheese 10% and Cheddar Cheese 10% the value X1 and X2 and Isolate Soy Protein 5%, cornstarch 5% the actual factor, where X1 and X2 and second actual factor is variable changes.

Salt Role in cheese making have 3 main functions, besides directly to flavor and sodium source, salt for preserves or pickling because have an effect on to reduction of level water. Gyration the usage of salt at cheese making is 1% to 10%, and will have an in with usage more than 2% to level of water.

Attribute Aroma

Optimal formulation Graph bases response organoleptic aroma can be seen in the picture-

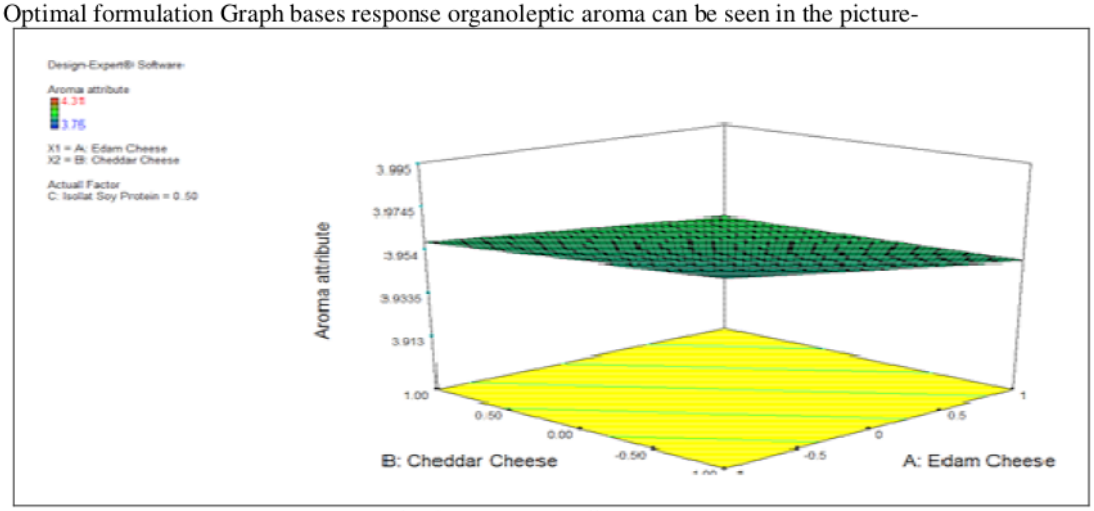

Fig.-3: Response Attribute Aroma

Coefficient Estimation that is coefficient of each factor that existed in equation conducted as follows-

Attribute Aroma = 7.40 + 0.12A + 0.043B - 0.35C - 0.04D – 0.45AB – 0.12AC – 0.22AD - 0.017BC - 0.13BD – 0.21CD – $0.40A^2$ - $0.37B^2$ – $0.41C^2$ – $0.71D^2$

Graph above show optimal formulation bases response organoleptic aroma, response organoleptic aroma that predicted by graph this is the 7.4 where boundary under assesses response organoleptic aroma that is 4.4 and upper limit as high as 7.4. To reach value response organoleptic aroma are matching with the one which predicted by program at product Cheese Spreadable Analogue must uses Edam Cheese 10% and Cheddar Cheese 10% as value X1 and X2 and Isolate Soy Protein 5%, cornstarch 5% the actual factor, where X1 and X2 and second actual factor is variable changes.

Attribute Flavor

Coefficient Estimation that is coefficient of each factor that existed in equation conducted as follows-

Attribute Flavor = 7.45 + 0.085A + 0.056B – 0.29C – 0.061D – 0.38AB – 0.23AC – 0.22AD – 0.03BC – 0.16BD – 0.32CD – $0.55A^2$ – $0.60B^2$ – $0.63C^2$ – $0.60D^2$

Factors that assign value positive to response organoleptic flavor to product Cheese Spreadable Analogue that produced by for example: linear effect Edam Cheese, linear effect Cheddar Cheese. Whereas factors that assign value negative to response organoleptic flavor shall be as follows: linear effect Isolate Soy Protein and linear effect Cornstarch effect quadratic Edam Cheese, effect quadratic Cheddar Cheese, effect quadratic Isolate Soy Protein and effect quadratic cornstarch.

No existed interaction 2 factors that is synergic interaction to response organoleptic flavor. All interactions 2 factors give interaction antagonis, as for interaction that give effect antagonis as follows: Edam Cheese and Cornstarch and interaction between Isolate Soy Protein and Cornstarch, interaction between Edam Cheese and Cheddar Cheese, interaction between Edam Cheese and Isolate Soy Protein, interaction between Cheddar Cheese and Cornstarch and interaction between Cheddar Cheese and Isolate Soy Protein.

Optimal formulation Graph bases response organoleptic flavor can be seen in the picture-

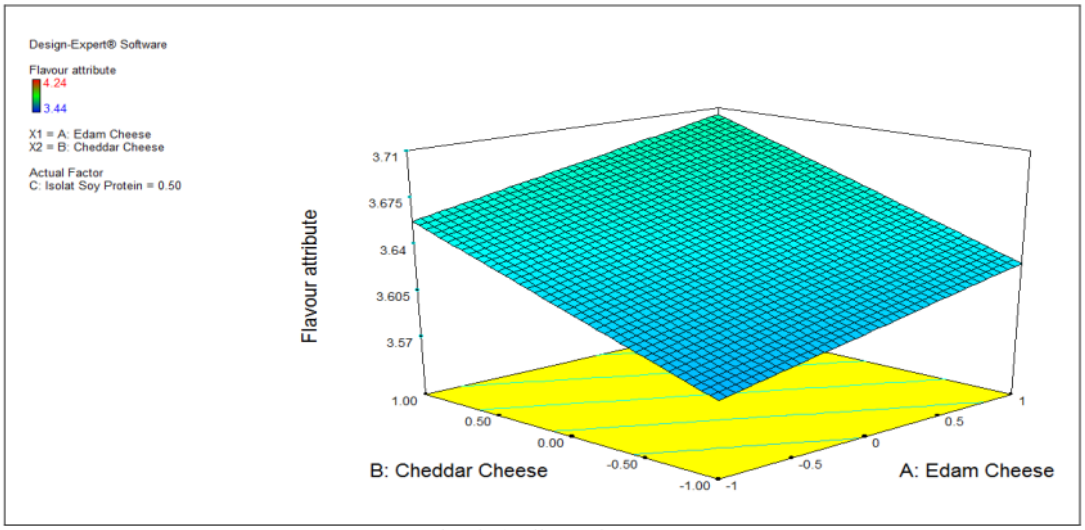

Fig.-4: Attribute Flavor

Graph above show optimal formulation bases response organoleptic flavors, response organoleptic flavors that predicted 7.45 where boundary under assesses response organoleptic flavors that is 4.05 and upper limit as high as 7.45. To reach value response organoleptic flavors matching with the one which predicted by program at product Cheese Spreadable Analogue must uses Edam Cheese 10% and Cheddar Cheese 10% the value X1 and X2 and Isolate Soy Protein 5%, Cornstarch 5% the actual factor, where X1 and X2 and second actual factor is variable changes.

Flavor cheese is formed especially by amino acids[2,6] enhance that flavor cheese is also formed by dispersion fat. Flavor from a large part of food materials usually unstable, that is can experience of change during handling and processing, in other hand texture change or viscosities can also alter flavor[4]. Flavor cheese tied to someone's apron string by level of fat, emulsifier materials, salt, amino acid (protein) and water that it contains[2].

Cheese Making is entered Cheese Spreadable Analogue that use mixture of cheese raw material Edam Cheese and Cheddar Cheese difference flavors referred to merely caused by Edam and also cheddar that used, but caused by amount of filler materials that is Isolate Soy Protein and Cornstarch and more and more Isolate Soy Protein and Cornstarch that used cheese Spreadable Analogue becomes growing less strong.

According to Frank (2004) in Septiarini[3] state that substrate that become determinant from flavor cheese is main component that indigenous to milk, that is carbohydrate (lactose and citrate) and substance metabolite (lactate, acetate, ethanol and acetone), protein (for example casein), peptide, amino acid and fat.

Law and Tamime[1] explain that other effect that maybe from salt emulsifier at cheese making covers flavor. Flavor that tend to like soap at cheese making is entered Cheese Spreadable Analogue is caused by sodium or potassium phosphate that consisted in at emulsifier salt.

Attribute Texture

Coefficient Estimation that is coefficient of each factor that existed in equation conducted as follows-

Attribute Texture: $7.00 - 0.038A + 0.28B - 0.14C + 0.072D - 0.26AB - 0.087AC + 0.075AD - 0.48BC - 0.12BD - 0.061CD - 0.42A^2 - 0.47B^2 - 0.42C^2 - 0.60D^2$

Optimal formulation Graph bases response organoleptic texture can be seen in the picture-

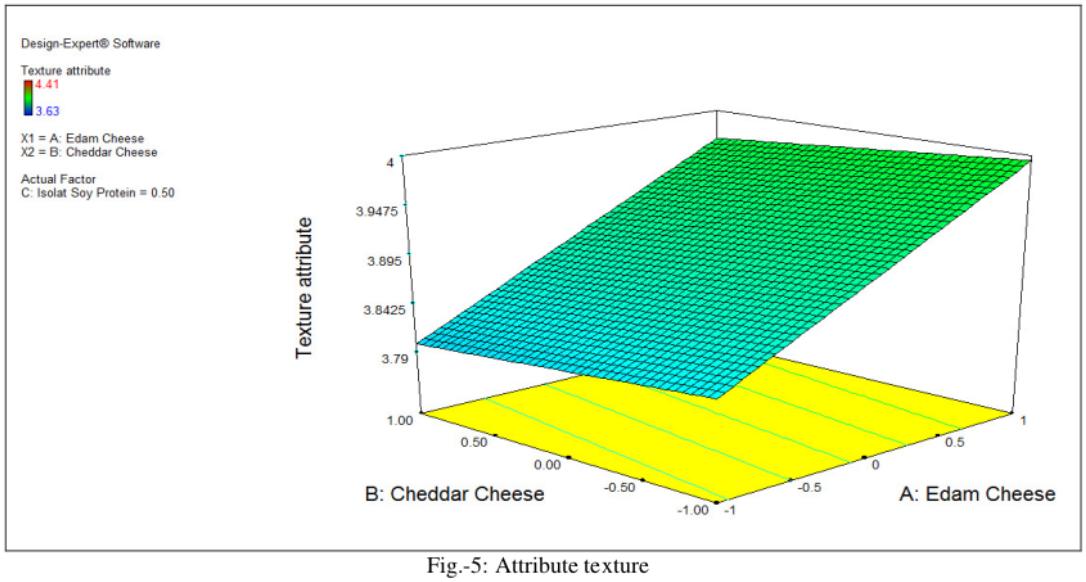

Fig.-5: Attribute texture

Factors that assign value positive to response organoleptic texture to product Cheese Spreadable Analogue that produced for example: linear effect Cheddar Cheese and linear effect Cornstarch. Whereas factors that assign value negative to response organoleptic texture shall be as follows: linear effect Edam Cheese, linear effect Isolate Soy Protein and effect quadratic Edam Cheese, effect quadratic Cheddar Cheese, effect quadratic Isolate Soy Protein and effect quadratic Cornstarch.

There is one interaction 2 factors that is synergic interaction to response organoleptic texture that is interaction between Edam Cheese and Cornstarch. Whereas interaction 2 factors that give interaction antagonis as follows: interaction between Isolate Soy Protein and Cornstarch, interaction between Edam Cheese and Cheddar Cheese, interaction between Edam Cheese and Isolate Soy Protein, interaction between Cheddar Cheese and Cornstarch and interaction between Cheddar Cheese and Isolate Soy Protein.

CONCLUSION

1. Edam cheese, cheddar cheese and soy protein isolate by program design expert response surface methodology central composite design method can optimize spreadable cheese analogue formula.
2. Optimal formulations based on data from all 11 above for product formulations spreadable cheese analogue selected by using 11.66% edam cheese, cheddar cheese 9.75%, and 3.84% isolate soy protein.

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REFERENCES

1. A.Y. Tamime, Processed Cheese and Analogues, Wiley-Blackwell. (2011).
2. D. Daulay, Fermentasi Keju, PAU Pangan dan Gizi IPB, Bogor (1991).
3. D. Septiarini, Effect of Addition Porang Flavor (Amorphophallus Anchophyllus) Modification as Emulsifier on Physical and Organoleptic (Texture and Flavor) Processed Cheese. (2013).
4. F.G. Winarno, Kimia Pangan dan Gizi. Gramedia, Jakarta. (2002).
5. H. Herawati, In Proceedings of Seminar Nasional Teknologi Peternakan dan Veteriner. (2011).
6. K.R. Nath, Cheese in Dairy Science and Technology. Handbook Product Manufacturing. (1993).
7. N. Dewi, *Jurnal Ilmu dan Teknologi Hasil Ternak*, **2**, 10 (2007).
8. S.F. Altekruse, B. Timbo, J.C. Mowbray, N.H. Bean and M.E. Potter, *Journal of Food Protection*, **10**, 1265 (1998).

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