

STUDIES ON THE QUALITY OF SOME CONFITURE ASSORTMENTS IN THE OFFER OF DIFFERENT TRADE UNITS FROM IAȘI

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ABSTRACT - *The concentrated products are obtained by removing a large quantity of water from the specific raw material, having as effect the reduction or even the interruption of the activity of biodegrading agents, because of the diminution in water activity. Concentration is a less energy-intensive process than dehydration, but in many cases, it cannot be applied to conserve a product, but it is associated to other procedures (pasteurization, thermal sterilization, packing in sterile spaces, ionization, etc). Confitures presented by the offer of the municipality of Iasi have specific features, depending on the producing unit, and we may identify some unprofitable aspects in terms of quality or the manner of conditioning and packing. This study has investigated comparatively the Romanian and imported products in terms of organoleptic – sensorial appreciation, aspect and integrity, hygienic quality and more important physical-chemical features.*

Key words: confitures, quality, commercial offer from the municipality of Iasi, sensorial quality, physical-chemical properties

REZUMAT – *Studii privind calitatea unor sortimente de dulcetuuri existente în oferta diverselor unități comerciale din municipiul Iași. Produsele concentrate se obțin prin îndepărtarea unei cantități importante de apă din materia primă specifică, având ca efect reducerea sau chiar încetarea activității agenților de biodegradare, datorită diminuării activității apei proprii. Concentrarea este un procedeu mai puțin energointensiv decât deshidratarea, dar, în foarte multe cazuri .nu se poate aplica singur pentru conservarea unui produs, ci se asociază cu alte procedee (pasteurizarea, termosterilizarea, ambalarea în spații sterile, ionizarea etc). Dulceturile din oferta existentă în municipiul Iași prezintă caracteristici specifice, în funcție de unitatea producătoare, putând fi identificate și unele aspecte deficitare*

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în ceea ce privește calitatea în sine sau modul de condiționare – ambalare. Studiul urmărește comparativ produse românești și din import, în ceea ce privește aprecierea organoleptică – senzorială, aspectul și integritatea, calitatea igienică și caracteristicile fizico – chimice mai importante.

Cuvinte cheie: dulcețuri, calitate, oferta comercială în municipiul Iași, calitate senzorială, proprietăți fizico-chimice

INTRODUCTION

Confitures are obtained by boiling and concentrating fruits or rose petals in sugar syrup and then they are packed in airtight containers and pasteurized. They are typically characterized by the exclusive production from fresh fruits. Being a non-jellified product, the fruits from a single species in proportion of about 45-55%, less than for confitures (that give the products name), are introduced in a mass of concentrated syrup. They have also homologated several assortments of vegetable confitures (carrots, autumn tomatoes, etc) (Arthey and Ashurst, 2001; Banu, 2002; Beceanu et al., 2003; Nicolescu, 2006).

Fruit conditioning involves washing (especially for wild fruits) ± calibration, repeated sorting (high quality uniform fresh fruits, with a firm texture but smooth without flaws), cleaning and specific removal of the uneatable parts ± peeling ± fruit pricking, scalding or enzyme deactivation ± division (for big fruits) ± texture strengthening treatments (lime water + CaCl₂ for 5 hours) (Albagnac et al., 2002 ; Anelli and Mencarelli, 1990; Banu, 1998; Salunkhe et al., 1999).

Boiling is made with or without preliminary diffusion (osmosis). Sweet fruits are the fittest for the sugar incorporation by osmosis. They alternate layers of sugar and fruits on stainless steel trays, starting with the bottom layer from fruits and finishing with the top sugar layer, during 14 hours (± 10 hours, depending on fruit) (Cheftel et al., 1997; Hui et al., 2004).

As concerns the sugar free products (green fruits, flower petals, quinces, some shrub fruits, etc.), they boil them in concentrated syrup made according to the specific consumption norms, from the available sugar. Adding glucose syrup in a reduced proportion (under 10%) prevents sucrose crystallization.

Boiling must not exceed 20-40 minutes, depending on assortment. Meanwhile, they remove foam, diminish pH within the allowable limit, by adding citric acid up to 1% and ensure homogenization by a slow stirring. The interruption of boiling is made after the refractometric checkup.

Intermediate *cooling* is essential, since it prevents the evolution towards caramelizing. They are dosed in packages, which are sterilized (15' – 10' – 15' / 100⁰ C), left to cool, labeled and stored. The batches are prepared in quantities of 200 kg at most (Dalla Rosa et al., 1992; Espiard, 2002; Moake et al., 2005).

Table 1 - The studied material

Name of product	Producer/distributor	Contents	Observations
Raspberry confiture	Trade Company Valahia 2002 Ltd	Raspberry, sugar, acidifying agent, citric acid	It does not contain colorants and preservatives
Cherry confiture	Trade Company Valahia 2002 Ltd	Cherries, sugar, jellifying agent (pectin), acidifying agent (citric acid)	It does not contain colorants and preservatives
Strawberry confiture	Arovit MIB	Strawberries, sugar, acidifying agent: citric acid, pectin	It does not contain preservatives
Sour cherry confiture	Arovit MIB	Sour cherries, sugar, acidifying agent, citric acid, pectin	Warning! Product may contain 1% stones. It does not contain preservatives
Wild fruits confiture	Arovit MIB	Raspberry, black currants, wild strawberries, sugar, acidifying agent: citric acid, pectin	It does not contain preservatives
Apricot confiture	Arovit MIB	Apricots, sugar, acidifying agent, citric acid	It does not contain preservatives
Peach confiture	Fruits and Vegetables Adamar Foods	Peaches, sugar, citric acid	Natural product
Nut confiture	Trade Company Conserv Buftea Ltd	Nuts, sugar, vanilla, acidifying agent: citric acid	Products does not abide by the conditions of soluble substance (in syrup), refractometric degrees (72°C Brix, according to STAS 3750-90). Pasteurized product
Grapes confiture	Trade Company Orkla Foods Romania	Grapes, sugar, acidifying agent (citric acid from natural sources)	Contents rich in fruits. No preservatives
Quince confiture	Trade Company Conserv Buftea Ltd	Quinces, sugar, acidifying agent: citric acid	Pasteurized product
Bilberry confiture	Trade Company Valahia 2002 Ltd	Bilberries, sugar, acidifying agent: citric acid	Natural product, it does not contain preservatives or colorants
Plum confiture	Hățegana Prod Ltd	Plums, sugar, citric acid	It does not contain preservatives or artificial ingredients
Gooseberry confiture	Arovit MIB	Sugar, gooseberries, acidifying agent: citric acid	It does not contain preservatives

Name of product	Producer/distributor	Contents	Observations
Blackberry confiture	Răureni Can Factory	Blackberries, sugar, acidity corrector, citric acid	Maximum temperature 20°C, air humidity maximum 80%
Rose confiture	Trade Company Conserv Buftea	Rose petals, sugar, acidifying agent: acid citric	Pasteurized product
Strawberry confiture	Trade Company Conserv Buftea Ltd	Strawberries, sugar, acidifying agent: acid citric	Pasteurized product
Apricot confiture	Trade Company Valahia 2002 Ltd	Apricots, glucose-fructose syrup, sugar, jellifying agent (pectin), acidifying agent (citric acid)	Pasteurized product
Gooseberry confiture	Răureni Can Factory	Gooseberries, sugar, acidity corrector (citric acid)	Maximum temperature 20°C, air humidity maximum 80%
Rose confiture	Răureni Can Factory	Rose petals, sugar, acidity corrector (citric acid)	Maximum temperature 20°C, air humidity maximum 80%
Orange confiture	Răureni Can Factory	Oranges, sugar, acidity corrector (citric acid)	Maximum temperature 20°C, air humidity maximum 80%
Sour cherry confiture	Conserv Fruct Ltd	Sour cherries, sugar, acidifying agent (citric acid)	Traditional recipe

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Possible flaws: improper fruit proportion, sucrose crystallization, fruit shriveling, colour changing, crystallization, surface foam, fermentation and getting moldy.

Standard features: The soluble substance in syrup must be of minimum 73⁰ Bx, acidity, of minimum 0.7% apple acid, while the validity term is of 12 months (Jongen, 2002; ***)

MATERIALS AND METHODS

During the interval 2005-2006, we took under study 10 confiture assortments and during the interval 2006-2007, we followed and analysed 11 assortments, all samples coming from different supermarkets of Iași (*Table 1*).

In this study, we have analysed the organoleptic appreciation, marking and air-tightness check up; determination of the soluble dry substance; acidity determination and determination of the total dry substance.

RESULTS AND DISCUSSION

After having effectuated the organoleptic analysis for the 10 confiture assortments, analysed in the interval 2005-2006, we noticed the following characteristics:

Table 2 - Organoleptic appreciation

Product / Producer	Characteristics
Raspberry confiture Trade Company Valahia 2002 Ltd	The jar lid is covered with a paper packing, fruits are soft, well penetrated by syrup, dark red coloured, and sweet-sour flavoured pleasant taste
Sour cherry confiture Trade Company Valahia 2002 Ltd	The jar lid is covered with a paper packing, fruits are soft, well penetrated by syrup, red-brownish coloured, sweet-bitter flavoured pleasant taste
Strawberry confiture Arovit MIB	The jar lid is covered with a paper packing, whole light red to pinkish fruits with red firm pulp, sweet intense taste characteristic to fruits
Cherry confiture Arovit MIB	The jar lid is covered with a paper packing, dark red fruits, syrup-like fluid jellified liquid, sour taste
Wild fruit confiture Arovit MIB	The jar lid is covered with a paper packing, <u>crushed fruits</u> , dark red coloured, sweet raspberry taste
Apricot confiture Arovit MIB	Soft pulp halves, well penetrated by syrup, light orange coloured, sweet-sour taste
Peach confiture Fruits and Vegetables Adamar Foods	<u>Torn pulp halves, oxidized brownish coloured</u> , sweet pleasant taste
Grapes confiture Trade Company Orkla Foods Romania	Hard whole fruits well penetrated by syrup, <u>light brownish coloured</u> , sweet pleasant taste

Product / Producer	Characteristics
Quince confiture Trade Company Conserv Buftea Ltd	Chopped fruit pieces, <u>crushed, light brownish coloured</u> , sweet-sour flavoured taste
Nut confiture Trade Company Conserv Buftea Ltd	Hard whole fruits, brown coloured, sweet flavoured taste

Packing air tightness: we noticed that all the studied assortments had an airtight container.

Fruit aspect: whole or pieces, of quite similar sizes in the same container, without bruises, fruits are uniformly spread in syrup. Cherries and sour cherries that had their stones removed mechanically were not considered crushed fruits. Exceptions are the quince confiture from the Trade Company Conserv Buftea Ltd and the peach confiture from the Fruits and Vegetables Adamar Foods, where we mentioned flaws. In the wild fruits confiture from Arovit MIB, since it is a mixture of several wild fruit species, only the bilberries remained whole, the others being crushed, and we could not identify any longer the raw material fruits of this product.

Fruit consistency. Fruits were soft, uncrushed, well penetrated by syrup.

Colour of the fruits in the same container is characteristic to the species and close to the natural one.

Syrup appeared as a glassy, viscous non-jellified and non-crystallized liquid. We noticed a slight jellification at strawberry confiture, apricot confiture, quince confiture and raspberry confiture, otherwise normal for these species. It did not contain pulp particles in suspension. The syrup without fruits was 2 cm high at most.

Syrup colour was uniform, close to the fruits colour without crystallization. We noticed a yellow-reddish hue for the green nut confiture. We considered as crystallized the syrups of grapes and quince confitures.

The **taste** of the confitures under study was sweet, pleasant, characteristic to the fruits or flavour added; they did not have a strange taste or smell.

Table 3 - Analytical determinations

Confitures	Soluble dry substance (°Bx)	Titration acidity (g % apple ac.)	Total dry substance (%)
Wild fruits Arovit MIB	82	1.9	86.371
Sour cherries Trade Company Valahia 2002 Ltd	62	2.67	85.395
Strawberries Arovit MIB	72	2.33	86.372
Raspberries Trade Company Valahia 2002 Ltd	58	2.74	89.525
Cherries Arovit MIB	64	1.85	89.148

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Table 4 - Analytical determinations

Confitures	Soluble dry substance (°Bx)	Titrating acidity (g % apple ac.)
Apricots - Arovit MIB	56	2.88
Peaches - Adamar Foods	52	1.64
Grapes - Trade Company Orkla	60	1.4
Quinces - Trade Company Conserv Buftea Ltd	60	0.894
Nuts - Trade Company Conserv Buftea Ltd	48	1.30

As for the soluble dry substance, we noticed that out of the 10 samples analysed, only six confitures (wild fruit confiture, sour cherry confiture, cherry confiture, grapes confiture, quince confiture and strawberry confiture) abided by the conditions of the STAS 3750-90. After having done the physical-chemical determinations for the 10 confiture assortments, we noticed that the soluble dry substance had a maximum value of 82°Bx for the wild fruit confiture and a minimum value of 48°Bx for the nut confiture. After having made some analyses, the soluble dry substance for grapes and quince confiture had the same value of 60°Bx. We also noticed that some samples had a better diffusion of the fruit syrup, which led to a homogenous product.

Confitures had different levels of the titrating acidity depending on assortment, the apricot confiture being the most acid (2.88 g apple acid %).

The total dry substance has registered adequate parameters. The total dry substance had the highest value of 89.525% for raspberry confiture and the lowest value for sour cherry confiture of 85.395%. Since they are concentrated products, confitures had a high total dry substance with values over 82%.

In the interval 2006-2007, we analysed a number of 11 confiture assortments from different supermarkets of Iași. We did the following operations on them: organoleptic appreciation, determination of the net weight, checking marking and air-tightness, determination of the soluble dry substance, determination of acidity, determination of the total dry substance and humidity.

Table 5 - Organoleptic appreciation

Product / Producer	Characteristics
Bilberry confiture Trade Company Valahia 2002 Ltd	The jar lid is covered with a paper packing, whole fruits well penetrated by syrup, dark red coloured, viscous consistency, sour-astringent taste
Plum confiture Hategana Prod Ltd	Fruit halves with skin, fluid consistency well penetrated by syrup, dark red-brownish coloured, sweet flavoured taste
Gooseberry confiture Arovit MIB	Fruit halves with skin, fluid consistency well penetrated by syrup, dark red-brownish coloured, sweet flavoured taste
Blackberry confiture Răureni Can Factory	Dark red fruits, soft fruits with stones, there can be seen strange bodies, fluid consistency, sweet perfumed pleasant taste

Product / Producer	Characteristics
Rose confiture Râureni Can Factory	There is little product on the interior part of lid, petals well penetrated by syrup, brownish coloured, fluid consistency, sweet flavoured taste, the product crystallized after a certain period of time.
Strawberry confiture Trade Company Conserv Buftea Ltd	Whole fruits, they accept a slight jellification, light red-brown coloured, sweet flavoured taste.
Apricot confiture Trade Company Valahia 2002 Ltd	The jar lid is covered with a paper packing, whole pulp halves, with a syrup-like liquid, light orange coloured, sweet-sour pleasant taste
Gooseberry confiture Râureni Can Factory	Whole fruits, slightly jellified liquid, dark red coloured, sweet-sour flavoured taste
Orange confiture Râureni Can Factory	Whole pulp halves, jellified syrup, yellow-brownish coloured, sweet flavoured taste
Sour cherry confiture Conserv Fruct Ltd	Whole fruits, syrup-like fluid liquid, dark-red coloured, sweet flavoured taste
Rose confiture Trade Company Conserv Buftea Ltd	Whole and half petals, syrup-like fluid liquid, red-brownish coloured, sweet flavoured taste, the product crystallized after a certain period of time

Table 6 - Analytical determinations

Confitures	Soluble dry substance (°Bx)	Titration acidity (g % apple ac.)	Total dry substance (%)
Bilberries Trade Company Valahia 2002 Ltd	52	0.85	70
Plums Hategana Prod	40	0.45	61
Gooseberries Arovit MIB	52	1.24	66
Blackberries Râureni Can Factory	64	0.98	70
Rose Râureni Can Factory	66	0.12	78
Strawberries Trade Company Conserv Buftea	60	0.59	76
Apricots Trade Company Valahia 2002 Ltd	62	1.11	80
Gooseberries Râureni Can Factory	70	1.18	77
Roses Trade Company Conserv Buftea Ltd	68	0.85	82
Oranges Râureni Can Factory	60	1.11	81
Sour cherries Conserv Fruct Ltd	66	0.91	75

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Out of the 11 analysed samples, only eight confiture assortments had the soluble dry substance abiding by the conditions of the STAS 3750-90. The assortments of plums, bilberries and gooseberries do not fall into this category.

The values of the titrating acidity have varied depending on the assortment, the gooseberry confiture (from Arovit MIB) was the most acid, while the lowest acidity was registered in the rose confiture (from Trade Company Conserv Buftea Ltd). The total dry substance was within the adequate parameters.

For the 11 studied assortments, the gooseberry confiture from Râureni had the soluble dry substance with the highest value 70°Bx, and the lowest value was registered at the plum confiture from Hațegana Prod of 40°Bx. For the strawberry confiture from Trade Company Conserv Buftea Ltd and the orange confiture from Râureni, the value of the soluble dry substance was 60°Bx. The value of 66°Bx was registered at two types of confitures, the sour cherry confiture from Conserv Fruct Ltd and the rose confiture from Trade Company Conserv Buftea Ltd. The bilberry confiture and the gooseberry confiture had the soluble dry substance of 52°Bx.

When determining the titrating acidity, the highest value was registered by the gooseberry confiture from Arovit MIB of 1.24 g% apple acid, and the lowest value was registered at the rose confiture of 0.12 g% apple acid, produced by Trade Company Conserv Buftea Ltd. The bilberry confiture from Mandy Foods and the rose confiture from Râureni had an acidity of 0.85 g% apple acid. The acidity value of 1.11 g% apple acid was registered by the apricot confiture from Trade Company Valahia 2002 Ltd and the orange confiture from Râureni.

The total dry substance had a maximum value of 82% for the rose confiture from Râureni, and the lowest value of 61% was determined for the plum confiture produced by Hațegana Prod Ltd. The same values of the total dry substance of 70% were found for the bilberry confiture from Trade Company Valahia 2002 Ltd and the blackberry confiture from Râureni.

CONCLUSIONS

After having made the study on the 21 confiture assortments, we noticed that not all the samples had a value of the soluble dry substance that abided by the STAS 3750-90. The following assortments have a less content in sugar than the law in force stipulates: raspberry confiture, apricot confiture, peach confiture, nut confiture, bilberry confiture, plum confiture and gooseberry confiture.

We noticed that the two rose confiture assortments from the companies Râureni and Trade Company Conserv Buftea Ltd were crystallized after a certain period of time (sucrose crystallization).

After the organoleptic analysis, we noticed that almost all the studied assortments abide by the characteristics imposed by the STAS 3750-90 on the fruit consistency, aspect and consistency of syrup, colour, smell and taste. There

is one exception for the blackberry confiture from the Trade Company Râureni, which has strange bodies in its contents.

The values of the titrating acidity for the 21 analysed assortments have adequate parameters.

The highest acidity assortments come from the Trade Company Arovit MIB. The apricot confiture and the gooseberry confiture had the highest values, as compared to the products from Râureni, Trade Company Conserv Buftea Ltd and Mandy Foods.

REFERENCES

- Albagnac G. et al., 2002** – *Technologies de transformation des fruits*. Edit. TEC&Doc, Paris
- Anelli Gabriele, Mencarelli F., 1990** – *Conservazione degli ortofruitticoli*. Technologie e aspetti fisiologico-qualitativi. Edit. Reda, Roma
- Arthey David, Ashurst Philip R., 2001** – *Fruit Processing. Nutrition, products and quality management*. Edit. Ana Aspen, Gaithersburg, Maryland
- Banu C., 2002** – *Manualul inginerului de industrie alimentară*. Edit. Tehnică București, Vol. I 1998, Vol. II 2002
- Beceanu D. et al., 2003** - *Tehnologia produselor horticole. Valorificare în stare proaspătă și industrializare*. Editura Economică, București, ISBN 973-590-744-5
- Cheftel J.-Cl. et al., 1997** – *Introduction a la biochimie et a la technologie des aliments*. Vol. I și II. Edit. Lavoisier TEC&DOC, Londres- New York, Paris
- Dalla Rosa M. et al., 1992** – *Prodotti ad umidità intermedia (IMF) a base di frutta: situazione attuale e nuove prospettive*. Rivista de Frutticoltura, nr. 5
- Espiard E., 2002** – *Introduction a la transformation industrielle des fruits*. Edit. Lavoisier TEC&DOC, Londres-New York, Paris
- Hui H.I., Ghazala Sue, Graham Dee M., Murrell K.D., Nip Wai-Kit (coord), 2004** - *Handbook of vegetable preservation and processing*. Edit. Marcel Dekker, New York
- Jongen W. (coord), 2002** – *Fruit and vegetable processing. Improving quality*. Edit. Woodhead Publishing Ltd. Cambridge
- Moake M. et al., 2005** – *Comprehensive review of patulin control methods in food*. Edit. Institute of food technologists
- Nicolescu Dorina, 2006** – *Alimente, alimentație, siguranța consumatorului*. Edit. Agir, București
- Salunkhe Ph. D et al., 1991**– *Storage, processing and nutritional quality of fruits and vegetables*. Vol. II. Edit. CRC, USA
- *** - www.codexalimentarius.net/web/standard_list