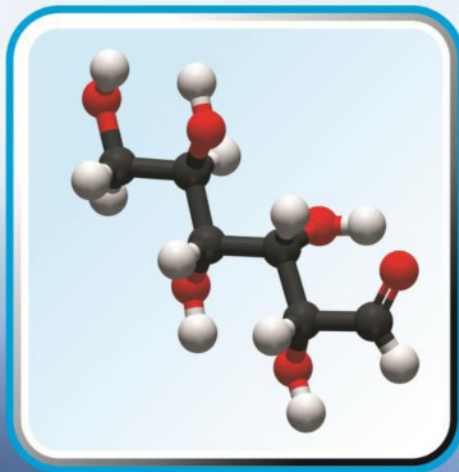


Македонски Фармацевтски Macedonian БИЛТЕН Pharmaceutical Bulletin



57 (suppl) 2011





5-ТИ
КОНГРЕС
НА ФАРМАЦИЈАТА
НА МАКЕДОНИЈА
СО МЕЃУНАРОДНО УЧЕСТВО

ПРЕДГОВОР

Овој број на Македонски фармацевтски билтен е специјален број на списанието посветен на Петтиот Конгрес на фармацијата на Македонија со меѓународно учество.

Во списанието се опфатени апстрактите кои од Научниот одбор се прифатени за презентација на Конгресот.

Апстрактите се печатени во оригиналната форма во која се доставени од авторите, без лекторирање и дополнително техничко обликување или пречукување па поради тоа овој број технички го нема вообичаениот стандард на Македонскиот фармацевтски билтен.

Авторите се потполно одговорни за содржините на нивните соопштенија.

PREFACE

The current issue of the Macedonian pharmaceutical bulletin is a special edition of the Fifth Congress of Pharmacy of Macedonia with International Participation.

The following issue of Macedonian pharmaceutical bulletin contains abstracts accepted by the Scientific Committee for the presentation at the Congress.

Abstracts were printed in their original form as submitted by the authors, without language corrections, technical editing or retyping.

Therefore, the layout doesn't meet the generally agreed upon standards required by the Journal.

Authors are fully responsible for the content of the submitted articles.



DEAR HONORED GUESTS, INVITED SPEAKERS, DELEGATES AND STUDENTS,

On behalf of the Scientific and Organizing Committee it is a pleasure to welcome you to Ohrid for the 5th Congress of Pharmacy in Macedonia with International Participation. The congress is organized as a joint activity of the Macedonian Pharmaceutical Association and Faculty of Pharmacy - Skopje as a quadrennial event since 1995.

This year's conference promises to be our most exciting and rewarding one yet, since more than 800 Pharmacists, among them scientists, educators, policy makers, professionals and the student community will be presenting and discussing some of the major opportunities and challenges affecting the pharmaceutical profession, today.

A great number of oral sessions and poster presentations will give both young and established scientists the opportunity to present their work and share ideas with colleagues on different topics. The opening lecture and the interdisciplinary plenary lectures presented by opinion leaders in particular fields are designed to create starting point for a fruitful congress for researchers, pharmacists and other health professionals. The scientific sessions that follow will start with opening lectures from a leading scientists in a particular field and will cover: I. Pharmaceutical Analysis / Quality Assurance / Regulatory Affairs, II. Pharmaceutical technology and biopharmacy, III. Pharmacoeconomy / Social Pharmacy, IV. Clinical biochemistry / Toxicology / Food and nutrition, V. Medicinal aromatic plants, VI. Clinical pharmacy, VII. Pharmaceutical chemistry / Biomolecular sciences. New trends in academia and education will be discussed during the half day Academic session. Two Workshops organized within the Congress, one on modern analytical techniques and one that will promote Regional ISPOR Chapter Macedonia will further enrich the activities planned for health professionals and scientists interested in those fields. The student session has a goal to introduce our students and other students from the region to experienced pharmaceutical and medical professionals, educators and scientists.

Best oral and poster presentations, selected by a Special Congress Award Committee will be awarded with prizes donated by our general sponsor.

You are invited to submit extended papers for publishing in Macedonian Pharmaceutical Bulletin immediately after the Congress.

We are especially grateful to the dedication of the entire faculty and all other colleagues and collaborators and our sponsors that have accepted to be a part of the Congress activities to ensure that this event is a success

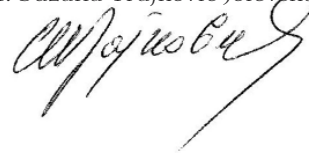
We wish you a successful Congress in Ohrid!

Regards,

Chair of the Scientific Committee
Prof. Katerina Goracinova



Chair of the Organizing Committee
Prof. Suzana Trajkovic Jolevska



ПОЧИТУВАНИ ГОСТИ, ПОКАНЕТИ ПРЕДАВАЧИ, ДЕЛЕГАТИ И СТУДЕНТИ,

Во име на Научниот и Организационен одбор задоволство е да Ви посакам добредојде во Охрид на 5-тиот Конгрес на фармацевти во Македонија со меѓународно учество. Конгресот е организиран од Македонското Фармацевтско Друштво и Фармацевтскиот факултет – Скопје, како настан кој се одржува секои четири години почнувајќи од 1995 година.

Програмата на овогодинашениот Конгрес е доказ за постојаниот напредок и промоција на овој настан. Повеќе од 800 делегати, меѓу нив и научници, професори, експерти и студенти, ќе презентираат и дискутираат за главните можности и предизвици кои ја засегаат фармацевтската професија.

Големиот број на орални и постер презентации, ќе им дадат можност како на младите така и на искусните научници да ја презентираат својата работа и меѓусебно да разменат идеи на различни теми. Воведното предавање и интередисциплинарните пленарни предавања презентирани од експерти во соодветните области ветуваат почеток на успешна работа на научниот дел од Конгресот. Научните секции кои следат, ќе започнат со воведни предавања од врвни научници во: 1. Фармацевтски анализи/ Обезбедување на квалитет/ Регулатива, 2. Фармацевтска технологија и биофармација, 3. Фармакоекономија/Социјална фармација 4. Клиничка биохемија/Токсикологија/Храна и исхрана 5. Медицински ароматични растенија 6. Клиничка фармација 7. Фармацевтска хемија/Биомолекуларни науки.

Во текот на Академската секција, ќе се дискутираат новите трендови во науката и образованието. Во рамките на Конгресот ќе се организираат две работилници. Првата ќе ги обработува современите аналитички техники, а во втората ќе се промовира регионалниот огранок на ISPOR, што дополнително ќе ги збогати активностите планирани за здравствените работници и научниците инволвирани во тие области. Студентската секција има за цел да ги промовира нашите и студентите од регионот, во професионалните, академските и научните кругови.

Најдобрите орални и постер презентации, одбрани од Комисијата за доделување награди и признанија, ќе бидат наградени од нашите генерални спонзори.

По завршување на Конгресот, ги покануваме авторите да поднесат проширена верзија на апстрактите во форма на оригинални научни трудови во Македонскиот Фармацевтски Билтен.

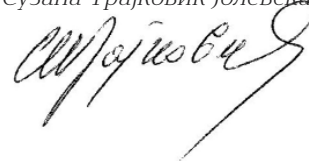
Особено сме благодарни на посветеноста на колегите од Фармацевтскиот Факултет - Скопје, сите останати соработници како и на нашите спонзори, кои прифатија да бидат дел од активностите на Конгресот.

Ви посакуваме успешен Конгрес во Охрид!
Со почит,

Претседател
на Научниот одбор
Проф. Д-р. Катерина Горачинова



Претседател
на Организационен одбор
Проф. Д-р. Сузана Трајковиќ Јолевска



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ЗАКЛУЧОК

Овој апстракт ја опишува употребата на анализа на ризик како алатка за управување со девијациите во рамките на фармацевтското производство. Овој метод употребува дијаграм на тек, со кој се одредуваат и класифицираат девијациите преку нивното влијание на квалитетот на производот, врз основа на дефинициите содржани во ICH Q7A.

Со целосно воведување на информациите обновени во основната ризик анализа за процесот, познавањето на процесот може постајано да се подобрува во однос на: *критични точки*: предефинирање на контролните граници; *критичните својства* за квалитет на производот и како истите соодветствуваат на процесните параметри; *податоци за капацитетот на производот*; *ефикасноста на мерките во системот за КМ/ПМ*. Овој пристап овозможува да се постапува ефективно со девијациите, намалување на ресурсите потребни за елиминирање на неважните инциденти и овозможува проактивен пристап за постојано подобрување.

РЕФЕРЕНЦИ

ICH Q9, ICH Q10, ICH Q7A
EC Directive 93/42/EEC of June 14,1993 and amended M5
21 CFR part 211 requirements regarding deviations and role of quality unit

EFFECTS OF FORMULATION VARIABLES ON THE PARTICLE SIZE AND VIABILITY OF L.CASEI - LOADED IN WHEY PROTEIN-CA-ALGINATE MICROPARTICLES

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The health benefits of the probiotics are becoming more recognized and utilized nowadays. Among lactic acid bacteria, *Lactobacillus casei* has been found to colonize human GIT and exert many health benefits. In general, probiotic cells are very susceptible to harsh conditions and various approaches have been used to improve their viability and to reduce cell damage and loss of viability during processing and storage (1, 2). By adopting improved methods to enhance the survival and stability of bacteria by means of biopolymeric structures, an increased delivery of viable cells can be achieved (3, 4). Among the biopolymers used as coating agents, alginate and whey proteins appear as potential candidates since they are entirely biodegradable and used in many types of food. (4) A new approach in combination of emulsion method and subsequent coating was used in order to reduce cell damage during processing and increase the final cell count. The aim of this work was to evaluate the influence of the formulation variables of *L. casei*-loaded whey protein-Ca-alginate microparticles on the particle size and the survival of the mentioned probiotic during the processing.

MATERIALS AND METHODS

The probiotic culture, *Lactobacillus casei* 01, freeze-dried, was purchased from Chr. Hansen, Denmark. As encapsulating agent, alginate-LF 10/60 (Protanal, FMC Bio-polymers, UK) was used. For the emulsion method of microencapsulation, olive oil (Sigma Aldrich, USA) containing 0,2% Tween 80 (Merck, Germany) was used. The cross-linking of the microparticles was performed by CaCl₂ solution. For additional coating of the microparticles, native solution of commercially available 100% hydrolyzed whey protein isolate (Dymatize Nutrition, USA) was used.

Emulsion technique was applied to aqueous dispersion of alginate and *L. casei* (10ml) in olive oil (40ml) containing 0,2% Tween 80 to obtain spherical particles, which were then cross-linked in CaCl₂ solution. Microparticles were subsequently coated with hydrated native whey protein for 1 h, isolated, washed and freeze-dried (-50°C, 0.07 mbar, 24 h, Freeze-Dryer, Labconco, USA).

After the preparation, Ca-alginate and whey protein-Ca-alginate microparticles loaded with the probiotic were immediately measured using a Mastersizer Hydro-2000S, Malvern Instruments Ltd., UK. The survival of the microencapsulated *L. casei* was evaluated in two stages: prior to- and after lyophilisation. The viability of the cells was assessed in dispersion of beads in 0,05M PBS, pH 6,5 and the number of viable cells was obtained using the plate-count method on MRS agar, after serial dilutions in peptone water.

To deduce the influence of the formulation variables, polynomial regression model at 2nd level was used with the experimental matrix of 11 batches. Concentration limits of three variables were alginate (1 and 4% w/w), whey protein (1 and 3% w/w) and CaCl₂ (1 and 5% w/w). The cell load in the initial suspension was ca. 10-11 log₁₀cfu/g.

RESULTS AND DISCUSSION

The particle size obtained was in the range from 36.32-63.10 μm for the Ca-alginate microparticles (Fig. 1a), and 42.78-77.43 μm for the whey protein-Ca-alginate microparticles (Fig. 1b). Overall effects of the formulation variables pointed to the dominant influence of the concentration of whey protein on the particle size followed by the concentration of alginate. Higher concentration of whey protein and alginate in the coating medium resulted in increased particle size. Insignificant influence of the concentration of CaCl₂ was observed. (Fig. 2)

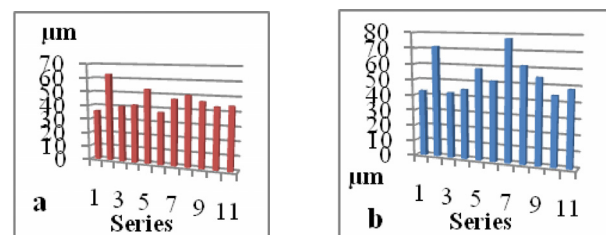


Fig.1: Particle size of *L. casei*-loaded microparticles: a) Ca-alginate, b) whey protein-Ca-alginate microparticles

The survival rate of the probiotic in the whey protein-Ca-alginate microparticles was between 9.30 and 10.78 log₁₀cfu/g, which is in the range from 90.34-99.58% in the particles prior to lyophilisation and between 84.16-98.37% in the particles after lyophilisation (with respect to the initial cell count).

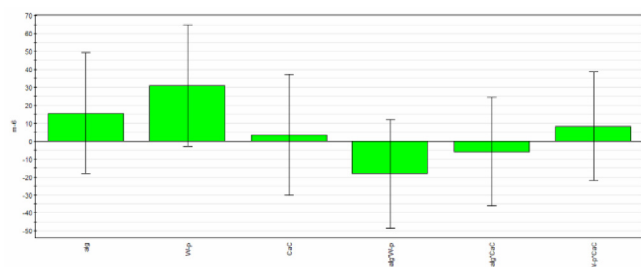
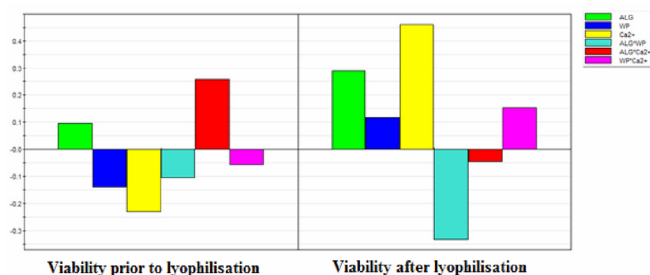


Fig. 2: Effect of the experimental variables on microparticle size.

The data pointed to the dominant influence of the concentration of alginate and CaCl₂ on the viability prior to-, and this trend continues, after lyophilisation. Significant negative effect of the alginate - whey protein interactions on the viability after lyophilisation was observed (Fig. 3), suggesting competition of the polymers and the probiotic for the same bonding sites.

Fig. 3: Effect of the experimental variables on the viability of *L. casei* during processing.



CONCLUSION

In conclusion, *L. casei* loaded whey protein-Ca-alginate microparticles were prepared with survival rate of the probiotic above the minimum therapeutic dose of 10⁷-10⁹cfu/g per day and particle size distribution suitable for the delivery of the probiotic to the lower intestine.

REFERENCES

1. Capela, P., Hay, T.K.C., Shah, N. P. Effect of homogenization on bead size and survival of encapsulated probiotic bacteria, *Food Res. Int.* 2007; 40: 1261-1269.
2. Mandal, S., Puniya, A. K., Singh, K.: Effect of alginate concentration on survival of microencapsulated *Lactobacillus casei* NCDC-298, *Int. Dairy J.* 2006; 16: 1190-1195.
3. Krasaekoopt, W., Bhandari, B., Deeth, H.: Evaluation of encapsulation techniques of probiotics for yoghurt, *Int. Dairy J.* 2003; 13: 3-13.
4. Gbassi, G. K., Vandamme, T., Ennahar, S., Marchioni, E.: Microencapsulation of *Lactobacillus plantarum* spp in an alginate matrix coated with whey proteins, *Int. J. Food Microbiol.* 2009; 129: 103-105.
5. Kitabatake, N., Kineawa, Y.I.: Digestibility of bovine milk whey protein and β -lactoglobulin in vitro and in vivo. *J. Agric. Food Chem.* 1998; 46 (12): 4917-4923.

ПРОТЕИН-СА-АЛГИНАТНИ МИКРО-ЧЕСТИЧКИ СО *L. CASEI* -ЕФЕКТ НА ФОРМУЛАЦИСКИТЕ ПРОМЕНЛИВИ ВРЗ ВИТАЛНОСТА И ГОЛЕМИНАТА

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Во светот, сè повеќе се препознаваат и користат ефектите на пробиотиците врз здравјето. *Lactobacillus casei* колонизира во ГИТ на човекот покажувајќи многу поволни ефекти врз здравјето. Меѓутоа, пробиотиците се многу чувствителни на екстремни услови и постојат различни пристапи за подобрување на нивната виталност, за намалување на клеточните загуби и избегнување на оштетувања во текот на преработката и чувањето (1, 2). Примената на нови методи за зголемување на преживувањето на бактериите, со користење на биополимери, овозможува стабилност во услови на производство и испорака на поголем број витални клетки (3, 4). Од биополимерите, алгинатот и сурутскиниот протеин се потенцијални кандидати, поради биодеградабилноста и применливоста во различни видови на прехранбени производи (4). Во овој труд, користен е специфичен метод за подготовка на микрочестички од алгинат и сурутскин протеин со *L. casei*, со цел заштита и зголемување на виталноста на пробиотикот во услови на производство на финален пробиотски производ, чување и примена. Вршена е евалуација на влијанието на формулациските променливи врз големината на микрочестичките и виталноста на пробиотикот.

МАТЕРИЈАЛИ И МЕТОДИ

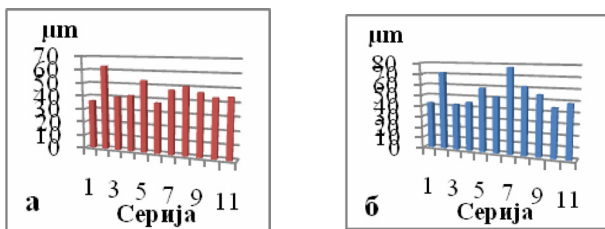
Користена е лиофилизирана култура *Lactobacillus casei* 01, од Chr. Hansen, Данска. Како инкапсулирачки материјали, користен е алгинат, alginate-LF 10/60 (Protanal, FMC Bio-polymers, UK). За методот на микроинкапсулирање со емулгирање користено е маслиново масло (Sigma Aldrich, USA) кое содржи 0.2% Tween 80 (Merck, Germany). Вкрстеното поврзување на честичките е извршено со раствор од CaCl₂. Дополнителното обложување на микрочестичките е со нативен раствор на комерцијално достапен 100% хидролизиран изолат од сурутскин протеин (Dymatize Nutrition, USA).

Со емулгирање на водена дисперзија на алгинат и *L. casei* (10ml) во маслиново масло (40ml) со 0.2% Tween 80 добиени се сферични честички, кои потоа вкрстено се вмрежуваат во раствор на CaCl₂. Честичките дополнително се обложуваат во раствор на нативен сурутскин протеин во тек на 1 ч., се одвојуваат, промиваат и лиофилизираат (-50°C, 0.07 mbar, 24 h, Freeze-Dryer, Labconco, USA). Веднаш после подготовката, честичките од Ca-алгинат и сурутскин протеин-Ca-алгинат се мерат со помош на Mastersizer Hydro-2000S, Malvern Instruments Ltd., UK. Преживувањето на *L. casei* во текот на производство е следено пред и после лиофилизација, во дисперзија на клетките во 0.05M фосфатен пуфер (pH 6.5), после сериски

разредувања во пептонска вода и засадување на MRS агар. За оценка на влијанието на формулациските променливи врз одговорите користен е полиноман регресиски модел на второ ниво, со експериментална матрица од 11 серии. Концентрациските ограничувања се: алгинат (1 и 4% *m/m*), суруткин протеин (1 и 3% *m/m*) и CaCl_2 (1 и 5% *m/m*). Бројот на клетки во почетната суспензија е од 10^{10} - 10^{11} cfu/g.

РЕЗУЛТАТИ И ДИСКУСИЈА

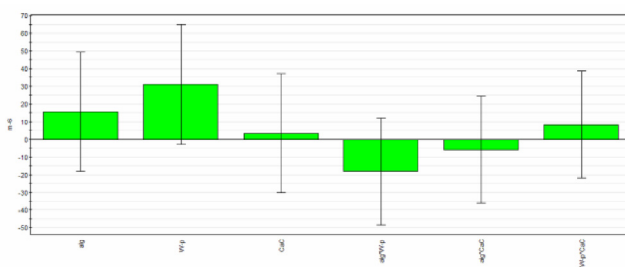
Големината на Ca-алгинатните честички се движи од 36.32 до 63.10 μm (Сл. 1а), а на суруткин протеин-Ca-алгинатните честички од 42.78-77.43 μm (Сл. 1б). Се забележува доминантно влијание на концентрацијата на суруткиниот протеин врз големината на честичките, следено од концентрацијата на алгинатот. (Сл. 2)



Сл. 1: Големина на микрочестички со *L. casei*: а) Ca-алгинат; б) суруткин протеин-Ca-алгинат

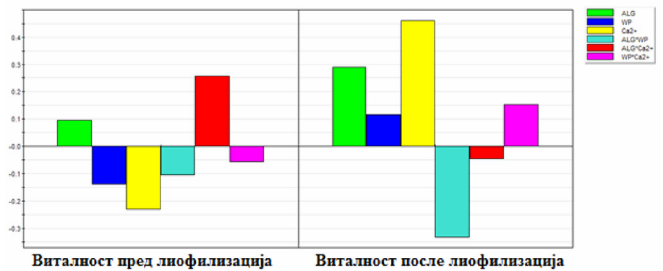
Поголема концентрација на алгинат и суруткин протеин резултира со поголеми честички. Влијанието на концентрацијата на CaCl_2 е незначително.

Преживувањето на *L. casei* во микро-честичките е помеѓу 9.30 и 10.78 \log_{10} cfu/g, односно 90.34-99.58% пред лиофилизација и помеѓу 84.16-98.37% после лиофилизација (во однос на иницијалниот број на клетки).



Сл. 2: Влијание на формулациските променливи врз големината на честичките

Забележано е доминантно влијание на концентрацијата на алгинат и CaCl_2 врз виталноста пред и после лиофилизација. Се забележува негативен ефект на интеракцијата суруткин протеин-алгинат врз виталноста после лиофилизација (Сл. 3), веројатно поради конкурентивност на полимерите и пробиотикот за исти врзивни места.



Сл. 3: Влијание на формулациските променливи врз виталноста на *L. casei* во текот на производството.

ЗАКЛУЧОК

Подготвени се микрочестички од суруткин протеин-Ca-алгинат со *L. casei*, во кои виталноста на пробиотикот е над терапевтскиот минимум од 10^7 - 10^9 cfu/g, а големината на честичките соодветна за испорака во долниот интестинум.

ЛИТЕРАТУРА

1. Capela, P., Hay, T.K.C., Shah, N.P. Effect of homogenization on bead size and survival of encapsulated probiotic bacteria, *Food Res. Int.* 2007, 40: 1261-1269
2. Mandal, S., Puniya, A. K., Singh, K.: Effect of alginate concentration on survival of microencapsulated *Lactobacillus casei* NCDC-298, *Int. Dairy J.* 2006; 16: 1190-1195
3. Krasaekoopt, W., Bhandari, B., Deeth, H.: Evaluation of encapsulation techniques of probiotics for yoghurt, *Int. Dairy J.* 2003; 13: 3-13.
4. Gbassi, G. K., Vandamme, T., Ennahar, S., Marchioni, E.: Microencapsulation of *Lactobacillus plantarum* spp in an alginate matrix coated with whey proteins, *Int. J. Food Microbiol.* 2009; 129: 103-105.
5. Kitabatake, N., Kinekawa, Y.I., Digestibility of bovine milk whey protein and β -lactoglobulin in vitro and in vivo. *J. Agric. Food Chem.* 1998; 46 (12): 4917-4923.

QUALIFICATION AND PROCESS VALIDATION ON BLISTER PACKAGING LINE

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INTRODUCTION

Qualification is the documented evidence that the equipment works efficiently and generates the expected results.

Process validation is the documented evidence that the process, operated within established parameters, can perform effectively and reproducibly and produces a product meeting its predetermined specifications and quality attributes.

OBJECTIVES

Aim of this work is to qualify the equipment for blister packaging and to perform a process validation on a blister packaging line.

DESCRIPTION

The packaging process on the blister line IMA C80/A81 with HAPA 729 and the packaging process consists of: adjustment of PVC and Alu foil, filling the recipient with bulk product, Alu foil printing, nests forming, filling tablets into blisters, blister sealing, printing of batch number and expiry date on the blisters, blisters perforating, blisters cutting, leaflets folding, cardboard boxes opening, insertion of proper