www.ThePharmaJournal.com

The Pharma Innovation

ISSN: 2277- 7695
TPI 2015; 4(3): 33-35

www.thepharmajournal.com
Received: 08-03-2015
Accepted: 28-04-2015

M.V Khalavka
Graduate student of department of Industrial technology of drugs, National University of Pharmacy, Kharkiv, Ukraine

O.A Ruban
Doctor of Pharmacy, head of the department of Industrial technology of drugs National University of Pharmacy, 61002, Pushkinska str. 53, Kharkiv, Ukraine

D.S Pulyaev
Associate Professor of department of Industrial technology of drugs, National University of Pharmacy, Kharkiv, Ukraine

I.V Kovalevska
Associate Professor of department of Industrial technology of drugs, National University of Pharmacy, Kharkiv, Ukraine.

Correspondence:
M.V Khalavka
Graduate student of department of Industrial technology of drugs, National University of Pharmacy, Kharkiv, Ukraine

Experimental confirmation of the kind and content of surface-active substances in the ointment "Glytatsid"

M.V Khalavka, O.A Ruban, D.S Pulyaev, I.V Kovalevska

Abstract
The paper presents the results of studies on the choice of surfactants for the development of emulsion ointment with dry extract of licorice, anestezin and nitazol.
This article presents data on studying the effect of type of emulsifier and its quantity on the rheological characteristics of the emulsions, as well as their stability.
The results obtained determine the auxiliaries and their optimal amount for this process.

Keywords: Emulsion ointment, emulsifiers, surfactants.

1. Introduction
Over the past decade, the prevalence of dermatological diseases of the skin in Ukraine increased on average by 17%, due to changes in the conditions of life - the most common allergens, genetic predisposition, the use of synthetic products, air and water pollution, which in combination leads to a decrease of immunobiological reactivity. One solution to this problem is to create complex products with herbal raw materials.
Using of emulsion bases enables administered drugs in aqueous and the oil phase, which makes it possible to prepare ointments combined type.
To achieve a uniform distribution of medicament at the soft skin surface to have a particular relationship between the surface and interfacial tension of the emulsion layers. In the preparation of the emulsion is necessary to consider the following factors: what emulsifier or a mixture of them must be selected to produce an emulsion with certain properties, what type of an emulsion under these conditions, how it will be stable and which rheology properties it will have. To ensure fulfillment of predetermined conditions makes rational choice of emulsifier which adsorbs at the interface of oil / water to form a monomolecular film, reducing the free energy of the phase-forming medium and structurally mechanical barrier around the emulsion droplets to prevent them coalescence.
To determine the type of emulsifier commonly used semiempirical scale numbers hydrophilic-lipophilic balance (HLB). Using the above system can predict the choice of surfactants and the final characteristics of the emulsion. For this it is necessary to know the structure of the surfactant, the nature of oil, the specific interaction of the components and the ratio of aqueous and oil phases, i.e. to determine parameters of the distribution coefficient between the aqueous and oil phases. Thus, knowing the HLB of the oil phase can determine optimum HLB for its emulsification [3, 4].
The aim of our study was the choice of surfactants for the development of emulsion ointment with dry extract of licorice, anestezin and nitazol.

2. Materials and Methods.
Objects of the study were samples emulsion ointments emulsifier with different ratios of type 1 and 2, which were prepared by direct emulsification at a temperature of 50 - 70 ° C in a laboratory mixer with impeller speed of 1000 r / min for 15 min. (Table. 1).
Measurement of rheological parameters of model samples was carried out on a rotary viscometer "Myr 3000 V2R" (Viscotech, Spain) in the system of coaxial cylinders as described in the State Pharmacopoeia of Ukraine (2.2.10) in a wide range of shear rates and shear stresses. Studies were performed at (25 ± 0,1) °C. Determined the yield strength, the type of flow and the presence of thixotropic properties.
Stability of emulsions was investigated by incubation at 40 ° C for 24 hours. Droplet size distribution was carried out microscopic method (laboratory microscope Konus Academy, Italy) with 100 times dilution in water-glycerol mixture to reduce the Brownian motion [4].

3. Acknowledgement

Based on the physico-chemical parameters (iodine value, spreadability, viscosity) of the oil phase as corn oil was selected. Based on literature data, it was found that corn oil HLB equal to 11.7, so that to obtain a stable emulsion we need to choose an HLB of more than 11 [1, 2].

It is known that the desired HLB value can be obtained by mixing two emulsifiers having an HLB value above and below the desired. In some cases, emulsifiers with limit values freeze ratio and the hydrophilic part of the effective individual substances. To calculate HLB of two emulsifiers used formula (1), and taking into account the contents of each HLB emulsifier therein:

$$HLB_a \cdot x + HLB_в \cdot (1 - x) = HLB_{(a+в).}$$ (1), where

HLB a - HLB emulsifier I-st kind,
HLB в - HLB emulsifier II -d kind,
HLB a + в - HLB emulsifier blend,
x - concentration of emulsifier I-st kind, %
(1-x) - concentration of emulsifier II-d kind, % [5].

For the pre-selection of the emulsifier was studied stability of emulsion bases. For this sample immediately after preparation was placed in a measuring tube and left in an incubator at 40 0C. Stability was assessed in terms of volume and the separated aqueous phase and fat change appearance: appearance flakes inhomogeneity 0.5, 1, 2, 24 hours. Results of the study were assessed on a scale of 10, and the uniformity of the emulsions was determined visually.

A comparative study of the samples (Fig. 1) show that the emulsions prepared using emulsifiers of I-st type Olivem 1000 and Planta M, are colloidal stability. At a concentration of 3% in the stratified emulsion for 30 minutes to form two phases (samples 1, 3). Increasing concentrations did not increase the stability of emulsions, the ratio change was only observed phase separation (samples 2, 4). Emulsions prepared using Emulgin SMO 20 after 2 hours was isolated an oily phase (samples 6, 7, 9, 12, 18, 19, 21). Using Ceteareth 20 resulted in the formation of stable emulsion after 24 hours there was a small layer separation of the fat phase (samples 5, 8, 10, 11, 14, 16, 17, 20, 22) (Fig. 1).

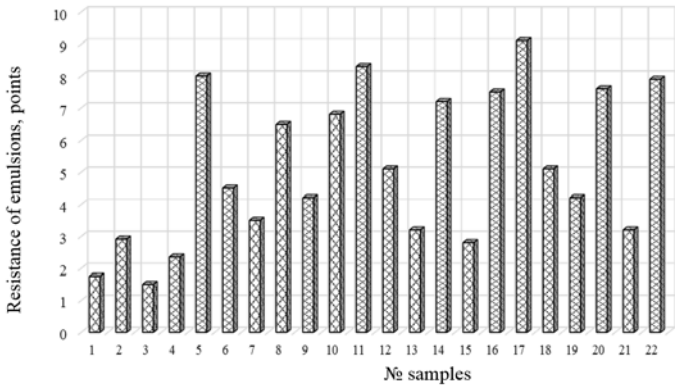

Fig 1: Effect of the nature of emulsifiers on the stability of emulsions

Table 1: Composition of studied emulsions with different containing of emulsifiers

Name of the substances	Number of samples / composition of samples%																					
	6 % emulsifiers										8 % emulsifiers						10 % emulsifiers					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Corn oil	20,0																					
The active substances	8,50																					
Dimodan OT					1,86	1,74					2,48	2,32					3,10	2,90				
Ceteareth 20					4,14			3,96		3,3	5,52			5,28		4,40	6,90			6,60		5,50
Lanette SX									2,64	2,7						3,60					4,40	4,50
Emulgin SMO 20						4,26	4,02		3,36			5,68						7,10	6,30		5,60	
Lanette O							1,98	2,04						2,72	3,52				3,60	3,4		
Olivem 1000			3	5									5,36		4,48							
Planta M	3	5											2,64									
PEO-400	10,0																					
Propylene glycol	10,0																					
Purified Water	To 100,0																					

Thus, on the basis of studies for further study samples were selected №№ 5, 8, 10, 11, 14, 16, 17, 20, 22 based on of emulsifiers Dimodan RT, Lanette SX, Lanette Ceteareth 20 and in a concentration of 6%, 8%, 10%.

Physical properties of the emulsifier layer adsorbed on the interfacial surface of oil-water concentration and affect the rheology of emulsion stability. Therefore, we have studied the structural and mechanical properties of these samples.

In all the samples formed structured systems that are experiencing the effect of the concentration on the viscosity of emulsifiers. Shear stress limit at which the system begins to flow in the range of 9.5 - 10.4 N/m^2 to 6% (samples 5, 8, 10) 13.6 - 18.5 N/m^2 to 8% (samples 11, 14, 16), 19.3 - 24.1 N / m^2 to 10% (samples 17, 20, 22).

Thus, for further studies, samples were quantitatively content 6% of emulsifiers. With this amount of emulsifier molecules at relatively great distances from each other, which guarantees a stable emulsion. Analysis of the viscosity characteristics of the samples number 5, 8, 10 showed that the optimal ratio of the parameters of viscosity and thixotropic properties observed in sample number 5.

For the final determination of the concentration of emulsifier I-st and II-d type was performed analysis of variance models emulsions prepared using different ratios of the emulsifier blend sample №5. The degree of dispersion of the emulsion ointment is an important indicator that defines their stability

and consistency. According to the research literature it is known that the emulsion is considered stable if the optimum dispersion of droplets of emulsion ointments - 0.1-1 micron droplets and are within the same size. For the optimal choice of the ratio of emulsifier I-st and II-kind samples are prepared at a concentration of 1/3, 1/4, 1/5, 1/6, where the content of Ceteareth 20, respectively, increased the number of the sample, respectively, the number of Dimodan OT decreased (Fig. 2 - 5).

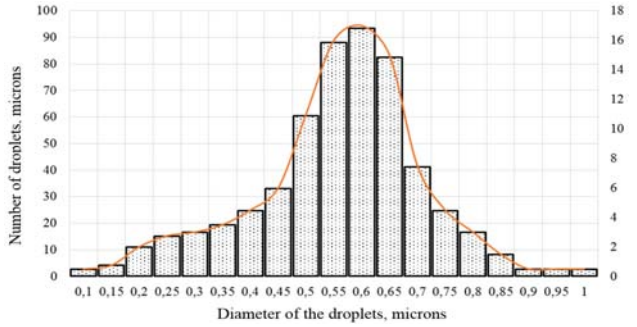

Fig 2: Histogram of the droplet size distribution at a ratio of emulsifiers Dimodan OT and Ceteareth 20 1:3.

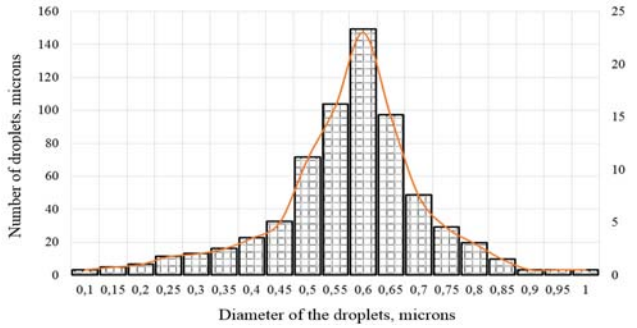

Fig 3: Histogram of the droplet size distribution at a ratio of emulsifiers Dimodan OT and Ceteareth 20 1:4.

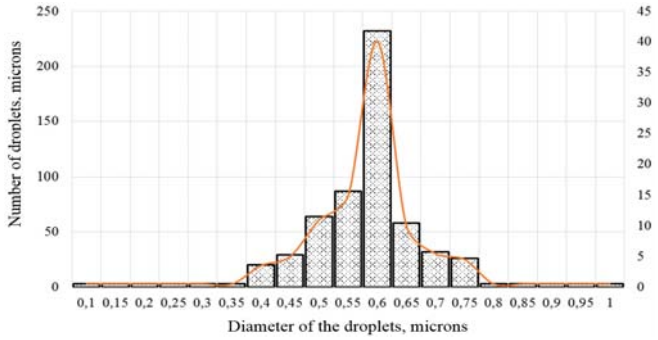

Fig 4: Histogram of the droplet size distribution at a ratio of emulsifiers Dimodan OT and Ceteareth 20 and 1:5.

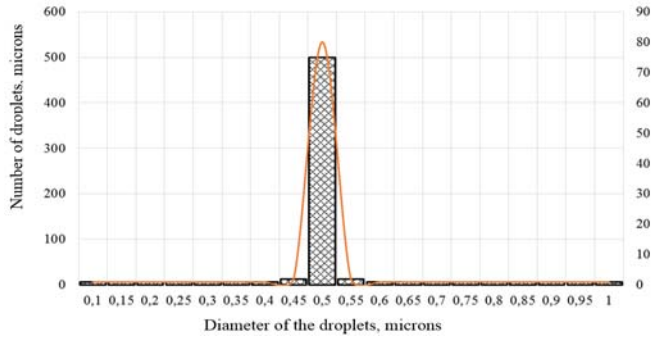

Fig 5: Histogram of the droplet size distribution at a ratio of emulsifiers Dimodan OT and Ceteareth 20 1:6.

From the data presented in Figures reliable curve is obtained at a ratio of 1:6, all other samples upper limit stretched much further distribution of the size of the optimum frequency, lower than that indicates a large amount of droplets of different sizes.

In the study of the properties of the emulsion ointment is particularly important to get the size distribution around the mean value because of the emulsion obtained with different droplet size may be different characteristics.

The data, obtained with sample which content Ceteareth 20 Dimodan 5.0 and 1.0 has a total volume of the dispersed phase droplet diameter of 0.5 um in an amount of 90%, which will provide a stable ointment viscosity is obtained. When the ratio of emulsifier 1 st and 2d type, 1:3, 1:4, 1:5, droplets are formed with different diameters, which will significantly affect the viscosity of ointments by changing the area of high shear.

Therefore, as a rational ratio of emulsifiers first and second kind, was part of the emulsion ointment base "Glytatsid" was elected to the sample number 5 (Ceteareth 20 and Dimodan OT 1: 6), a total of 6%.

4. References

1. Rowe RC, Sheskey PJ, Owen SC. Handbook of Pharmaceutical Excipiets, London-Chicago, 2006, 888.
2. Перцев ІМ, Дмитрієвський ДІ, Рибачук ВД, Хоменко ВМ. та ін. Допоміжні речовини в технології ліків: вплив на технологічні, споживчі, економічні характеристики і терапевтичну ефективність, Золоті сторінки, Харків, 2010, 600.
3. Кутц Г, Фрисс С, Хенниг С, Люнц Н. Косметические кремы и эмульсии: Состав. Получение. Методы испытаний: пер. с нем, 2004, 267.
4. Плетнев МЮ. Поверхностно-активные вещества и композиции. «ООО Фирма Клавель», Москва, 2002, 768.