

Prospects of Applying Bentonite Based Ointments in Conservative Dentistry

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Abstract

Bentonite compound - Clay (tikha) Ascane, which is permitted for medical application by the ministries of Health of Georgia and Russia for treatment of gastroenterological and dermatological diseases has been developed and investigated at the institute of Pharmaco-chemistry of the Academy of Sciences of Georgia. Ascancol - aqueous gel of Tikha-ascane, is used as a drying and anti-inflammatory remedy for treatment of skin ulcer, burns, skin chafing and bedsores. It is also used as an antacid and absorbent. Tikha-ascane does not cause allergy and skin sensibilization. The medication has a property of masking unpleasant tastes. Regarding all these, it is prospective to use Tikha-ascane and Ascancol for prevention and treatment of mucous membrane diseases.

Keywords: *bentonite, clay, conservative dentistry*

High technologies are broadly used for production of efficient preparations in modern medicine and pharmacology, but such high-priced medications are often unavailable for patients.

The investigation and study of the possibilities of effective use of Georgia's natural mineral wealth for making some new efficient medical facilities should be the most important tasks of our contemporary medicine.

At the beginning of XX century hardly anyone could say that clay was a useful mineral, although people had been familiar with lots of its positive characteristics long ago.

Nowadays practical importance of clay is connected to experimental sciences, special methods of which reveal its secrets.

Bentonite is one of the sorts of clay, which is rightfully called a "miraculous clay".

As we have already noted above, despite the fact that bentonite belongs to a category of modern useful minerals people in different regions of the world have been using some of its positive features since the ancient times. Experience preceded precise knowledge again.

More concrete data concerning bentonite as an objective raw material, appeared at the end of XIX century. V. Talor began to obtain it in 1888 on his rancho in the state of Wyoming, USA [9]. It is known that clayey minerals basically consist of flint oxides, aluminum, magnesium, ferric and water. It was stated by the scientists who studied detailed crystalline structure of different clayey minerals, and it was also proved that the basic structure at atomic grid of the majority of clayey minerals consists of two main units.

One of them is alumina, the other - flint oxide hydrate. The structure of alumina consists of two layers of atoms of oxygen or hydroxyl, between which the atoms of aluminum are located at an equal distance from oxygen and hydroxyl groups in octagon coordination. The structural grid of flint oxide hydrate consists of tetrahedral groups of SiO_4 arranged in the form of repeatedly reiterative hexogen web. The latter forms the layer of compounds $\text{Si}_4\text{O}_6(\text{OH})_4$ or Si_4O_{10} whose charges counterbalance the charges of atoms, residing nearest to them [3, 5, 6, 7] .

C. Davis and C. Wachter [11] offer to divide bentonites into two main classes:

1. Alkiline-earth bentonites where the kations of the first group will serve as superficially active kations i.e. basically natrium bentonites, absorbing a large amount of water greatly swelling and creating fine stable suspense water dispersions

2. Alkaline - earth bentonites where the kations of the second group will serve as superficially active cations i.e. calcium bentonites, absorbing little water, not swelling a lot and quickly precipitating in water dispersion.

On the whole pharmaceutical industry uses only natrium bentonites with the highest swelling ability.

Application of bentonites in pharmacy became possible due to their special physical characteristics which condition the technological process of manufacturing different medications. Among them for instance its indifference to the other component used for making preparations as well as it's ability of forming the gel of sufficient viscosity even in low concentrations, which is necessary in fabrication of tablets, granules and particularly different types of ointments and cosmetic preparations.

Bentonites are also used for manufacturing of hydrophilic ointments and as bases of ointments as well as for stabilization of suspension and emulsions, as a filler and agent which facilitates splitting during the production of tablets and as a supporting material while cleaning the fluid extracts, etc. It should be noted that Bentonite must necessarily possess the following characteristic features, particular color, harmless for health while used for external and especially internal therapy. It must have specific granularity, moisture, swelling ability and homogeneity. The most important characteristics of bentonite clays is their extremely great swelling ability in water and high capability for an exchange reaction.

One of the bentonite based clay, obtained in Georgia - Tikha-ascane is a local, available, cheap, harmless and effective preparation created on the basis of natural materials. The gel Tikha-ascane (Ascancol) possesses a drying and anti - inflammatory action [12]. Tikha-ascane considered to be appropriate if it satisfies the following requirements: 7-10 grams of Tikha-ascane while grinding with 90-93 grams of water (water is added gradually) must produce well-disperse colloidal, creamy-color mass which should neither flow out when holding the vessel upside down nor leave a white film after being massaged into the skin [4, 8].

In the majority of cases the preparations of local action characterized by anti-microbial activity are made on hydrophobic base, which lowers the release of active substances and causes the "hotbed effect". The antibiotics and sulfamids lodged in the hydrophobic base do not have impact on hospital cultures of microorganisms. The investigation results proved that the gel Tikha-askane promotes the full release of antibiotics from the base and correspondingly improves the anti-microbial effect of the ointment [10,13].

Ascancol is used as absorbent, as antacid for prevention and treatment of gastric and duodenal ulcer [1] as a drying and anti-inflammatory ointment for treatment of skin ulcer, burns, skin chafing and bedsores [14,15,16] and also for treatment of intertrigo in children. The observations have proved that treatment with Ascancol of pyoderma and skin maceration as of post-wound complications has a good preventing effect and it accelerates the process of healing. [9]

According to clinical conclusions in case of vaginal erosion the surface of damaged areas is purified, turns pale and the epithelization is directed towards the center. Several investigations were carried out in order to reveal the possibilities of applying Ascaneol in surgical and urological practices [9].

Regarding the fact that all these tissues are covered with multi-layer plane epithelium as well as in the oral cavity, we consider that Ascancol application in conservative dentistry will be favorable and successful for prevention and treatment of mucous membrane diseases. [2].

Consequently, we think that it is prospective to apply Tikha-ascane and Ascancol in conservative dentistry due to its exceptional qualities stated above.

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Перспективы использования мазей на основе бентонитов в терапевтической стоматологии

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Р Е З Ю М Е

Тиха-аскане, доступное и недорогое местное средство, применяется на практике как противовоспалительный препарат при лечении язв кожи, ожогов, пролежней и зарекомендовал себя как эффективный и безвредный препарат. Не вызывает аллергии и сенсibilизации кожи. Имеет подсушивающий эффект. Можно использовать как антацид для профилактики и лечения язвы желудка и 12-ти персной кишки. Как адсорбент, имеет свойство маскировать неприятные привкусы. Считаем использование тиха-аскане и асканкола для профилактики и лечения заболеваний слизистой оболочки полости рта перспективным.

Ключевые слова: бентонит, глина, терапевтическая стоматология