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That highly prized textile fiber: wool as a magical and medicinal remedy

Abstract

The subject of this paper is the exploration and study of wool fiber beyond the production of fabrics and the manufactures associated with it. We want to try a step forward in the research of the complex world of certain textile fibers applications, such as wool, in the practice of medicine and ancient magic. Pure wool was considered a natural and traditional remedy for the prevention of inflammations and irritations of the skin. These applications were already known and practiced in Antiquity. For ancient cultures, wool possessed, and medical and magical virtues, as well as pharmacological qualities.

Keywords: wool, magic, medicine, ancient remedies

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Introduction

Wool in ancient times was one of the most important materials. Its use as a textile raw material is widely demonstrated, as can be seen in the textile remains found in archaeological contexts. But wool was also used in other areas, such as magic, religion and medicine. We will approach the study of wool in these fields, starting by highlighting its physicochemical properties. These properties show some wool virtues that the ancients did not understand, but they had discovered. Accordingly, this fiber was used in magic rituals and therapeutic actions at Mesopotamia and Ancient Egypt, and later, was introduced in Greek and Roman medicine. In this study, we highlight some of the most amazing examples of the use of wool, based on ancient magical beliefs, as well as pharmacological properties described in ancient scientific treatises, such as *de materia medica* from Dioscorides and *Natural History* of Pliny the Elder.[1]

Composition and physical-chemical properties of wool

Wool is the hair substance, a type of fur, which covers the body of certain ruminant mammals (Figure 1). Its main function is to protect the animal from the weather.

Figure 1 Sheep wool fleeces, Triste (Huesca, Spain) textile workshop (© M. Julia Martínez García).

Sheep is the animal belonging to the *Ovis* genus, that has more wool covering its body.[2] Currently more than 50 breeds of domestic sheep are known. One might think that the wool of ancient sheep has nothing to do with the present, thanks to the selection of woolen cattle made since. During Antiquity already some types of sheep were more appreciated than the others according to the characteristics of their wool: long, medium, and short (Wingate, 1987, 355 s.). Morphologically, wool fiber is made up of two types of cells: the cubic cells which form the outer layer or the cuticle and the cortices which form the cortex. In the larger fibers there is a central structure called marrow. The movement of the cuticle scales is responsible for the shrinking of the wool after having been agitated in water. It is a very temperature sensitive fiber. Since it is a protein, high temperatures deteriorate it. Food shortages or deficiencies affect the quality of wool fibers. They then break more easily by traction. Likewise, climatic agents, such as the sun and the rain, act on the chemical composition of some fibers parts exposed to its action, damaging and reducing they resistance.

In its natural state, sheep's wool contains a components series in addition to fiber. One of the main components is wool grease, a water-soluble material called "churre",[1] provided by perspiration and external substances, such as dirt and vegetable matter that animals recover on pasture. These pollutants are removed during fiber processing. Unlike cotton and most synthetic fibers, wool a homogeneous structure does not have. Wool fibers have very complex physical and chemical compositions that have evolved over millions of years to protect wild sheep from extreme conditions (Rippon 1992; Leeder 1984). Wool is formed mainly by proteins, but it contains 1% of non-proteinaceous material, like lipids. Clean wool fiber contains a large amount of keratin, a sulfur-rich protein found in the waste cystine products, one of the amino acids. Keratin represents 82% of the proteins that make up the wool fiber and the remaining 17% is made up of non-keratin proteins. Wool complete hydrolysis by acids or alkalis means produces a mixture of 18 amino acids, all very important in many physiological processes: Glycine, Alanine, Phenylalanine, Valine, Leucine, Isoleucine, Tryptophan, Proline, Serine, Threonine, Tyrosine, Methionine, Cystine, Cysteine, Arginine, Lesin, Histidine, Aspartic Acid and Glutamic Acid. The amount of cystine in wool can change depending on genetic causes, animal physiological state, a

[1]The woolen fiber is covered with a protective layer consisting of sebaceous materials, and animal skin secretions consisting mainly of potassium salts. All these substances are called « suarda » and sometimes « churre ».

malnutrition stage or because of dietary changes. As a result, some types of wool are more popular than others depending on the intended us.[3]

Wool fiber morphology, composition, and properties make it an impenetrable insulating barrier against heat exchange by protecting from heat and cold. Thanks to the molecules helical shape of its, it is very resistant to traction and very elastic, being able to stretch by more than 50% of its initial length. In addition, wool can be agglomerated by friction movements, creating a thicker fabric known as felt, much appreciated in ancient times (Figure 2). Pliny said: with wool we make the felt which wet in vinegar resists the iron.[1]

Figure 2 Natural unwashed sheep wool. Lejre Experimental Archaeology Center, Copenhagen (© M. Julia Martínez García).

Wool washing action, the grease removal and dirt, produces a sub-product that has many applications in dermatology and cosmetics, the lanolin. This lanolin has been used as a simple medicine since ancient times and was one of the animal remedies described by Dioscorides, *adeps lanae*. This substance is still used today in modern pharmacy as a component of various drugs.[4] Usually, it is used as a base in the cosmetic products preparation, and it is widely used in masterful formulation in concentrations around 6%. Frequently it is combined with urea (5-15%), with a corticosteroid such as 0.1% actamid triamcinolone and with menthol at 0.5%. It is also combined with salicylic acid, drug known for its calming and keratolytic properties, in concentrations of 5%. This composite promotes the penetration of active ingredients.[5] Lanolin, a sticky and greasy secretion, is currently used as a food additive. Its use is approved by the FDA.[2] A 1824 Dictionary of Medical Sciences still prescribed wool fleece[3] as a topical medicine for lymph nodes inflammation, goiter, and some rheumatic pains.[4] Its use was explained by the fat that dirty fleeces contain, this which has some emollient and resolving properties: "confirmed by experience". The use was also recommended because lanolin was recognized as wool harmless and effective sub-product. Normally, therapeutic use of *oesypum*, a substance known from ancient times for its medicinal properties, in Pharmacopeia treaties is prescribed.

The scientific explanation given to explicate this pharmacological action is that dirty wool applied to any part of the body which starts to inflame releases ammonia by degradation, putting it into action as a resolving drug, and wool's own fat, lanolin, as an emollient. Wool acts by absorbing sweat and any possible body toxic substances. Likewise, the skin comes into contact with natural lanolin, which produces a anti-inflammatory and calming effect. This hyssop or *oesypum* is not only used to relieve human diseases. In some rural areas of Badajoz, Spain, the shepherds oral tradition and ethno-veterinarians knowledge, prescribe it as useful remedy for eliminating sheep´s intestinal worms, by introducing this fat through the animal's anus. Traditionally, to eliminate the sheep grime or scabies, the rural societies make some a magical ritual joined to the healing formulas recitation which describe the composition of a poultice. Usually, these recipes be attribute to Saint John the Baptist, Saint Blas, or Saint Antoine, such as, for example, the following imploration:

With a wool swab, water from seven sources, three "pisquinas" of salt and seven drops of oil.

In early twentieth century Pharmacopoeias when the pharmacological formulation was at its peak, perhaps for lack of industrial drugs, it is reported that lamb fat has the property of absorbing an amount of water equivalent to four times its weight (Bouchardat & Rathery 1920: 592). Wool is a poor conductor of heat and can multiply its density by 30% in water vapor. Water does not collect on the wool surface but gets inside the fiber in the vapor form, undergoing powerful water retention. There is a thermodynamic caloric exchange process which must be considered in its application as a bandage. In the same way, wool superficially repels aqueous liquids, thanks to the impermeability linked to a very thin waxy material layer present on the wool fiber surface. This layer acts as a natural barrier against liquids. Its hydrophobic behavior means that the fibers do not straighten due to the water presence. This natural wax which repels aqueous liquids, prevents them from penetrating inside the fibers. Likewise, in contact with the skin occurs friction, like a slight friction, which tends to regularize its functions (DCM, 54-55). Finally, today the applications of natural fibers, such as wool, are being studied in the fields of new textiles, the biomedicine and protection, with selective properties that are good for human beings. This is based on the scientific application of clinical advances in wound healing, antimicrobial activity study, and the use of tissues enzyme-based. More specific research themes are aimed at the production of antimicrobial textiles to avoid bio-deterioration of wool bandages.[6]

Keratin, a wool fundamental component, is a structural protein rich in essential amino acids, such as L-cysteine which makes it a valuable ingredient for skin and hair care. Cysteine is an important sulfide source (sulfur) in human metabolism. Cysteine is also necessary for sheep to produce their wool. Ewes need feed that contains an abundance of protein to produce good fleece. It is essential that they incorporate lively acids into the pasture. In dry conditions, the lack of grass causes the sheep to stop producing wool or to produce a wool lower quality. Wool is a protein product; this is why sheep need feed that contains an abundant amount of protein to produce good fleece. In addition, sulfur is of paramount importance for amino acids synthesis like methionine and cysteine, two wool constituents, and it intervenes during rumination.[7]

Magic and ritual uses of wool: from ancient times to the present day

As we noted above, wool has intrinsic properties that make it suitable for some therapeutic use. Nevertheless, in Antiquity, other extrinsic virtues were attributed to it, linked to the complex magic world, beliefs, and superstitions.

[2]FDA *;* Food and Drug Administration, USA.

[3]*Vid.* Panckoucke, Premier Dictionnaire Médical Encyclopédique, Vol. 6, 1824 Paris

[4]Today we find sanitary dressings on the market, for example, the pure healing wool Popolini 0M +, recommended for its antibacterial properties.

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Purple red dyed wool was used in the preparatory sacrifices of goddess Ceres mysteries.[5] Among the Greeks and the Egyptians the red color is associated with sanctification and regeneration. It was the color attributed to the god Pan. This god was assimilated with the light and sun color, divine manifestation symbol. His hair is red and Orpheus calls Pan: "eternal fire". Thus, fire was seen as a purification and regeneration symbol.[8] Red, by assimilation with blood, has also been used in an apotropaic and cathartic sense.[9] In the spring celebrations in honor of the goddess Cybele the trunk of a tree, which was a deity, was wrapped in wool strips and adorned with violets garlands. The tradition also tells that the violets were born from the Attis blood, like roses and anemones had sprung from the Adonis blood.[6,10] The transposition of the blood vital property to the red color had become a sign of good or bad fortune Figure 3. It was used in magic rites associated with both a beneficial action, and with evil powers. Perhaps that was the meaning associated with the red woolen bands put around a body part or an object to protect the corresponding divinity from demons and wicked pursuers, as well as ghosts of the dead.[11] In addition, the Vestals also wore a sort of red woolen headband around the head, which could be considered a protection symbol.[12,13]

Figure 3 Yarns and woolen fleece dyed in purple, red and yellow colors, like those used in wool protective amulets (© M. Julia Martínez García).

We have chosen as main source the incantations and charms used as healing remedies and recipes: medical prescriptions where wool plays an important role, and more generally useful, in the broadest sense of the term. They include simple instructions for getting rid of a headache, fever, or ulcer. But they can also contain advice to ward off thieves, wolves, snakes, lightning, hail or the evil eye: in summary, any possible misfortune form. In addition to these medical and obvious reasons, they can also to include techniques for interpret a dream, attracting the love or desire of another person, harming an enemy, etc.[7,14]

Magic practice are a constant throughout antiquity.[15] Numerous magic formulas, generally some loves spell, prescribed the use of red dyed woolen threads in order to "bind" to the beloved eternally. Theocritus shows us in his writings a case of this nature: *that a cup be crowned with fine red wool to force a love charm* (Teoc., *Id.*, 2). Red woolen lucky charms were very popular in Greece and Rome. Probably the magician's prodigious thread, the one he uses to recover lovers, quoted in classic poems, was covered with red wool (Faber 1938: 291).[13] Similarly, in Mesopotamia one of the rites developed during the wedding ceremonies was that of placing one on the other the palm of the future spouse hands and tying them together with a woolen thread, symbolizing union between husband and wife.[8,16] During the last century, there are still ethnographic parallels of the same kind of superstitions. For example, in Russia, a network has always been considered very effective against wizards, for its set of knots. It is common to see these Russian amulets made only of knotted threads; likewise, a skein of red wool around the arms and legs protects people from malaria and other fevers. Similarly, nine skeins wrapped around a child's neck were considered a prevention against scarlet fever.[10] Wool was also used to tie up the vessels that carried certain diseases or the spirits that caused them. We still know certain wedding ceremonies in Bosnia where the bride three times revolves around a small child, from left to right, and then the latter is wrapped in a woolen scarf in order to ensure health and vigor the future wife.[17]

Traditional historiography has speculated on the children murder in ancient Rome during some celebrations dedicated to *Lares* gods. The victims were thrown into the Tiber River on certain days fixed on a ritual calendar. Over time these rituals had become purely symbolic: the priests and vestals then offered woolen dolls which were thrown into the river during May Ides to celebrate a past tradition.[17] In addition, the Romans hung on the doors of all the Rome home some wool effigies, resembling men and women during the commemoration of the *Compitaliae* celebrations.[9] Reason for this farce was the belief that, on that day, the dead spirits wandered around the houses. It was believed that the dead took the woolen effigies from the door, rather than taking the people who lived there. They were vicarious offerings presented to spirits of the mother or grandmother, hoping that during their rounds of the city they would accept the wool effigies in place of the home inhabitants. In this way, they could deceive their ancestors with effigies, and would forgive their life another year.[10] Similarly, current anthropology is also interested in some cases healing study by integrating the spirit of the ancestors. Anthropologist Greenwood recounts a healing episode developed by a gypsy shaman. Shamanic action consists in pouring salt on the participants in the rituals, such as a protection kind against the disease spirits. In this ritual, they also have be using red wool dyed to patient and shamans protect (Greenwood 2009).

According to the principle of homeopathic magic, inanimate things, in the same way as plants and animals, can spread benefits or damage around them, in accordance with their intrinsic nature. We can suggest the hypothesis that, for ancient societies, wool was a material that assimilated the virtues or curses of objects, beings, or substances with which it came into contact. Greeks thought that a garment made of sheep's wool a wolf bitten would hurt the one who will dress with it, causing itching or skin irritations. Similarly, the Romans put on the house door, where the fiancée was going to enter, a red woolen

[5]These are the mysteries celebrated in honor of the goddess Ceres. It is one of the mystical religions in Roman times.

[6]There is a fable in which Attis is considered a human being transformed into a pine. This is one of those attempts to rationalize ancient's beliefs. These are proof that we find very frequently in mythology: bringing a pine from a forest, decorated with violets and woolen bands is similar to the modern folk custom of decorating the May tree or the tree of summer; thus, the image placed on the pine tree was only a representation of Attis, the spirit of the tree, saved for a year to be later burned

[7]This group of texts consists of simpler and more modest recipes, mainly small charms for domestic use, almost always for healing, as we find in the old textbooks on medicine, veterinary art, etc., such as of Pliny the Elder Books or Marcellus Medicus. Although partially influenced by the schema presented by the Egyptian magical papyri, they generally reveal a more primitive and unsophisticated nature.

[8]An account of the marriage ceremony between Bilitsounou and Zamamänadin

[9]*Compita* is a intersection, or a crossroads. The lares gods were the spirits of the dead guardians of the crossroads and limits of the lands.

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crown adorned with laurel. Moreover, the columns were covered with woolen strips that the bride was to touch upon entering. This was a way of home preserving from evils and spells.[10]

In Mesopotamia woolen wrappers were used during ceremonies intended to cure certain diseases attributed to demons, such as, for example, the demon called *Idpa* who acted on the head.[17] We know of an example of a healing ritual described by Maspero in which an Assyrian charmer heals a woman, *Iddina,* by purifying her and burning a flowers bouquet, a wool ball, goat hair, a dyed wool skein, and a bean. During the magical act, the magician repeatedly recites the following magic formula:

(…) *Branch leaves will never be reunited with the tree, and will not be used for the dyer works, the wool and the hair will not return any more to the back of the beast which carried them and will not be used any more to make clothes.*[10,16]

It's about "The enchantment magic" based on the almost song supernatural power, the chanting, and the repetition. The formula, in itself, has no magic power; it only acquires it in specific circumstances, pronounced by such person who has the right or the power, the wizard[18] In this kind of magic a spell or curse formula has the virtue of binding the will of the charmer who pronounces it, to beings of the world above with the world below.[19] Magician, the mediator of ritual act, uses local materials: dyed wool, goat hair, wool for weaving. He has the ability to build a ritual or an amulet from the available materials.[20] In this magical enchantment, the magician makes an association by similarity, which is then followed by the wish, that in the same way, the disease disappears.[21]

Another Mesopotamian healing ritual makes use of the patient sputum, and wool. "He catches a green frog in the water. The same day that he captured her, in his bed, the morning before he puts his foot on the ground, you drag frog from head to toe and you (sic) say the following:

Frog, you know the "grain" that grabbed me, [but I don't know]. Frog, [you know] the who grabbed me [but I don't know].

When you (try) to descend and return to your waters, you will return [the harm to] its garrigue. You have [The patient] says it three times [and] three times he spits in his mouth. You take it to the garrigue and you tie the foot with a strip of red and white wool [and you have it] to a basin". Clearly, the impurity, the disease, passes into the washing water and, it is supposed, the ailments will be eliminated in anything with which a patient has washed. At the same time in the formula had a process of association of the red wool with the flow of the grain, with the disease.[11,22] All materials: the frog, the red and white wool strip used in the ritual are the best substances adapted to receive, contain and transmit the magic power[23] When the disease is internal and the nature and location of the foreign body is unknown, the same thing is done, but in a symbolic way, through a mimetic process which represents extraction. The disease extraction is by way of transmission to another person, animal, or object (transfer and replacement).[19]

Around the world, in each culture, shamans or curators know local materials with a capacity or a healing power, or at least, with the build rituals capacity. So, at the misfortunes expiation we find, still in the 20th century, a ceremony practiced by the Gypsies of Eastern Europe during the Easter night. In this ceremony, a disease transfer to various objects with the purpose to protect persons of the disease. A wool bundle encloses the evils confined in a container: the medicinal herbs were confined in a tank with a dead and dried snake or lizard, which had been touched by each of the people present at the ceremony. This container was wrapped in red and white wool and was carried from tent to tent by the oldest of the Gypsies, finally was launched into the river or any other stream of water, not without first each of the members of the group had spat on him, and the witch will utter a few exhortations. The Gypsies believed that by performing this ceremony they got rid of all diseases, which otherwise would have affected them at the next year.[10]

We know that the wool use was widespread among the ancient Mediterranean peoples. However, it seems that it was not a raw material much appreciated by the Egyptians until the Hellenistic period. Moreover, in Ancient Egypt the shepherd profession as well as the sheep breeding was works little appreciated (Herod. II, 42; Strabo, XVII, 1, 23, 40; Diod. Sic., 1, 36). However, the bas-reliefs show us herds. Thanks to the Nile periodic flooding the pasture must have been quite abundant. Egyptian wool was not appreciated because of its very low quality, like hair. So, it was not used for weaving, however it was used to repair clothing by providing resistance. Greeks believed that the wool had been brought back to Greece by Hercules, from Egypt (Thedenat, *D-S*, *s.v*., *lana*, 914). Egyptian wool, as well as that of Ethiopia wool, similar of goat hair, was very different from Syrian wool (Herod., III, 113) : High quality white wool, or Milet's wool, soft and very white wool. For example, In the burial chamber of a wealthy Egyptian, the discoveries made by Champollion verified the existence of a few wool pieces among the offerings made to assist the deceased in the afterlife.

Role of the Egyptian physician, analogous to the Chaldean tradition, was not to give recipes and apply remedies, but to use magic formulas to expel the evil spirit who had possessed the sick.[17] For example, Maspero relates the visit of an exorcist to Egyptian Psarù . His wife calls to medicine-man Nibamon, who presents himself accompanied by two slaves carrying a grimoire and a chest full of ingredients: plants, clay, pieces of cloth (possibly wool), color dyes, wax effigies, or terracotta statues, all the material needed to practice exorcism.[16]

Likewise, Pliny exposes a curious procedure, closer to a curative ritual than a medicinal remedy. It's about of a woolen bag use with a grass seeds (*Cynodon dactylon L*). The ritual consists in bringing and attaching to a patient on an empty stomach, a woolen sachet with this plant. The patient must ask himself three times the question: why is the messenger coming? The emissary must respond to the sick person who brings something for a fasting person. Three days later, the patient must repeat the same ritual with another person (Plin., NH XXIV, 118, 180). In the part of his work intended to enumerate the fabulous traditions of magicians, he also describes a magical procedure for curing malarial fevers by wrapping certain objects with wool.

For the quartan fever they tie around the patient's neck, in wool, a fragment of a nail torn from a cross, or a piece of wood from the cross itself; the patient cured, they hide the wood or the iron in a cave where the sun never penetrates (Plin., NH XXVIII, 11, 46).

In the same way he presents a remedy that cures the same type of fevers. It involves placing the heart of a crocodile on a patient using a black sheep wool that has not been mixed with other colors and collected from the first shearing. Pliny recommended too an identical

[10]*(...) the leaves of the branch will never be reunited with the tree, and will not be used for the works of the dyer, the wool and the hair will no longer return to the back of the beast that wore them and will no longer be used to make clothes.*

[11]These are some magic rituals prescribed in ancient written sources. They are like that, even if today they seem absurd. They are some magic associations by sympathy of the color red with blood, pustules or other power objects of this color.

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remedy but substituting the crocodile heart for a chameleon heart (Plin., *NH* XXVIII, 28, 111).

The use of wool in witchcraft or healing rituals is not restricted to the ancient Mediterranean world (Figure 4).

Figure 4 Fetish bag, Ghana, Ref. Af1978,22.535. Sewn brown wool bag, decorated with nine rectangular padded charms made from leather or textile (© The Trustees of the British Museum).

In the India sacred books: *Vedas*, we also find curative charms in which the curative formula declamation is accompanied by a symbolic action in which wool plays a very important role. For example, to cure blackish pustules, the Indian doctor takes a bow of a rod stretched with a black woolen cord and directs against each pustule four black arrows, the tips of which are wrapped in woolen flakes (*K.S.* 32, 8-10 [*Kauçika- Sûtra*, *Charmes curatives* p. 194]). As the washing lightened the color of the woolen flakes that enveloped the arrows, it was assumed that the pustules would deflate and become lighter in color.

Medical uses of wool

So far, we have seen a few illustrative examples the wool use as an element used in magical rituals, healing ceremonies and atonement, exhortations, etc. However, its intrinsic properties have been specially evaluated in the medical and pharmacological field, where we find a wide variety of applications in Dioscorides and Galenus medical treatises, and Pliny the Elder work. In this context, it's necessary to highlight the Miletus wool (Caria), particularly valued for curative uses, the breed of sheep from which it originated being highly valued. The Caria wool trade had become a very important economic activity in Antiquity.

Dioscorides dedicated chapters 73 and 74 of Book II to wool (Diosc., de mat. med., II, 73, 74). The first of the two cited chapters is dedicated to greasy wool, εζια οὶσυπηςὰ, which he particularly differentiates from fluffy wool, whose virtues he celebrates. This wool is the one that is shorn at the neck level and between the ewe thighs. The applications he details for this wool type are:

A. Bathed in vinegar, oil, or wine it was useful for wounds, bruises, grazes, cardinals and to treat recently caused bone fractures.
B. Soaked in vinegar and with rose oil it is considered effective against headaches, stomach pains and any other body part.

The pharmacological properties of this wool are attributed to two properties: it is receptive to the liquids it moisturizes,[12] and it is softening because of its fat. n the next chapter, the Greek doctor describes the qualities and applications of the wool fat, or lanolin: its calorific virtue, fills and softens wounds, especially those located around the anus and uterus with clover and butter mixed. Wool fat applied in a wool flake it drags the menstrual and fetus and applies itself against the ears wounds and the sex. This wool is effective, in the same way, in case of corroded and scabby tear glands to treat the eyelid calluses and the eyebrows and eyelashes fall (Diosc., *de mat. med.,* II, 74).

Examples of the wool use in pharmacological applications given by Pliny are abundant. Its use is prescribed both as a vehicle for applying substances with other active principles, as well as itself medicine form. Examples of the wool use as excipient or pharmacological assistant are abundant. Thus, for the essential oil extraction such as *pisseolum,* Dioscorides says that we place the cedar end in a glass with wool and expressing it, it takes back the most volatile of the cedar oil. Moreover, Pliny speaks of a substance called *laser* extracted from the plant species called *silphium,* now extinct.[13] Egyptians, Greeks and Romans have used this plant and have attributed it emmenagogues properties. It applied in the vagina by a vaginal suppository means, or pessary made with wool (Plin., *NH* XXI, 39). Some digestive properties have been attributed to wine prepared with resin. Placed in the wool on the skin «it resolves the sediments» tells us Pliny (Plin., *NH* XXIII, 21, 64). A greasy wool was also used, dipped in a red or black wine, to cure dislocations (Plin., *NH* XXIII, 24, 47). This sebaceous wool was already differentiated by Dioscorides. Pliny's prescription reinforces the already established wetting tradition it with wine and applying it over bruises or fractures.

We have another recipe described by Pliny where he shows how to make a preparation from flattened olive leaves, previously wet with wine and rainwater. This plaster, in the form of wool weighing, stopped menstrual blood loss in women (Plin., NH XXIII, 34, 70). Applied in the same way, green olive marc is recommended to cure matrix diseases. (Plin., *NH* XXIII, 37). We also find another wool application dipped in olive marc, to restore dislocations (Plin., *NH* XXIII, 37, 74). The other wool application such as a carrier of pharmacological active ingredients, is that prescribed to soothe the teeth pain. In this case it is recommended to use fig juice applied with wool in the dental cavity or on the gums (Plin., NH XXIII, 64, 127). likewise, if you put a piece of wool soaked in *Chamaedaphne alexandrino* juice (*Ruscus racemosus* L.) on a woman's stomach, it prevents complications. This plant juice applied in a wool pessary was also recommended by Dioscorides (Diosc, *de mat med*., IV, 147; Plin., *NH* XXIV, 132).

In adittion, the *absentea* decoction applied in the wool compress form causes the urine flow and menstrual flows (Plin., *NH* XXVII, 28, 52). Another use as an adjuvant is to dampen the certain plants effect o having a corrosive skin action, as for example the *Enneaphyllon* leaves (*Enneaphylla dental* L.) application. A caustic plant that can only be skin used inside a wool package, so that it does not skin blister (Plin., *NH* XXVII, 9, 54). Body fluids have also been used in ancient medicine, such as fresh urine. It was prescribed, without fermenting,

[12]Possibly the perception of this wool quality made the ancients suppose that wool was able to take on the everything virtues or disadvantages of that came objects into contact with it, hence its wide use in magic acts.

[13]It is an extinct plant since the beginning of our era, similar to asafetida. Pliny tells us that only one plant was found in his time, which was sent to Nero as a gift (Plin, NH, XIX, 15).

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applied with a wool compress for the dog bite. It was also believed that the best remedy for liquids pathological accumulations in one of the body parts was to apply a pouch on the forehead containing woman's milk mixed with egg white absorbed in a wool wrapping (Plin., *NH* XXVIII, 21, 72).

In connection with the wool use dipped in vinegar we find a recipe described by Pliny to cure ear pain. It is a heifer urine mixture with vinegar. The said mixture would act as a liquid vehicle of manure and heifer gall mixed with the snake offal, all wrapped in wool (Plin., *NH* XXVIII, 48, 174-175). The same principle can be read in another recipe to treat bleeding, in which vinegar with fat from a male donkey (Plin., *NH* XXVIII, 73, 239).

Until here, all the wool uses that we have described are oriented towards the preparation of the various bandage types used in antiquity, in a way similar to modern transdermal devices made with cotton. However, the following remedy that we will describe details the *oesypum* use, or what in medieval times will be known as "greasy wool". This type of wool is part of the composition of a antidotal liniment made with woman's milk and jars fat wool. This remedy was used against diseases caused by the poison sea hare, mollusks of the genus Aplysia,[24] and other animals, in addition to curing the delirium caused by the henbane plant alkaloids.[25] Likewise, to treat wounds, is quoted to the use of a liquid obtained after pressing wool, previously soaked in wine, vinegar, cold water and oil.

Pliny quoted many medicinal remedies in which wool is indispensable. It coincides with Dioscorides in that, oily wool, mixed with vinegar or wine, is used in many remedies. However, he describes many other topical remedies in wool that have absorbed various liquids and minerals such as rose oil, cold water, nitro, Sulphur, etc. This wool would be applied to cure bruises, matrix inflammation, kidney colic, blood secretions, dog bites, blows, bruises, strains, headaches, stomach inflammation, ophthalmic indisposition, fistulas, etc. (Plin., *NH* XXIX, 9, 29-34). He also remarked the wool medicinal value sheared from the neck, and native to Galatia, Tarente, Attika and Miletus (Plin., *NH* XXIX, 9).

As we have been able to verify in the preceding paragraphs, wool possessed an important religious and medicinal value in the eyes of the Romans, heirs of an even more ancient knowledge. However, most of the remedies described by the classical authors concern the wool use in topical applications. However, Pliny says that some people take wool, orally, to heal themselves during an indisposition. This fact deserves our attention, since it highlights the belief that wool has certain intrinsic pharmacological properties. He says:

In addition, some people take wool, either from the shearing or from the fleece, cut of the top end, dry and cardent it, then put it uncooked in a earth vessel on the fire, sprinkle it with honey and burn it (Plin., *NH* XXIX, 9, 34).

According to this author, the same operation was done placing the wool on some beds made with pine shavings that were set on fire. The wool was collected and sprinkled with oil, then ground by hand and kept in small terracotta containers. The moistened ashes were left to rested. In both cases the operation was will done several times, until the ashes had a slightly pungent taste, but not acid. These preparations were kept, being used when needed as an excellent antiseptic.

Another wool type suitable for medical applications was *oesypum*, mentioned above. The wool that receives this name comes from the thighs and armpits. It is a dirty wool, which contains the secretions of sweat from sheep (Figure 5).

Figure 5 Dirty wool from Spanish Merino sheep, Triste (Huesca, Spain) textile workshop (© M. Julia Martínez García).

How to obtain this product, as well as its applications are also detailed by Dioscorides and Pline (Diosc., *de mat. med.,* II, 66; Plin., *NH* XXIX, 10, 35-38). The latter author remarked that the *oesypum* native to Athenian sheep was the best. This by-product, much appreciated, is obtained by bringing the wool to a boil, over low heat, in copper cauldrons. By letting it cool it forms a fat which is taken up in clay containers brought back to boil. The wool is allowed to cool in the sun until it becomes completely white and transparent. Posteriorly, will be put in tin jars. This wool was an excellent remedy topical against a skin, ophthalmic and dental multitude conditions. It was also much appreciated as a sheep themselves remedy, especially when they did not want to graze. Pliny quoted that if the tail of the sheep is tied strong with the armpit's wool or the thighs, they begin to graze the grass. Ovid detail the *oesypum* use by the women's toilet and confirms Pliny's quotation on the Athenian origin of this type of grease: (…) *What wouldn't it say about the foul smell of the grease that comes from Athens, extracted from the fleeces without washing?* (Ov., *Art am*., III, 213-214).

A. Laguna[26] in his commentaries on the Dioscorides work of mentions this dirty wool, and says:[14]

Llaman a la suziedad e la lana los Griegos Oesypo, de donde los médicos Barbaros corrompiendo el vocablo, la vinieron a llamar Hyssopo, añadiendo el sobrenombre de Humida (…)*, aunque también llamamos en Paulo Egineta, medico Griego, (griego), que es hyssopo humido.*

He praised the dirty wool virtues: natural, benign, it softens, reduces, and resolves all pain. The dirty wool use and the fat that was extracted from it is known from the Middle Ages. We take again the data of the treatise of Surgery written by D. Diego de Covo, where we speak of the same thing with the name; «ysopo» (Sanchez 1991: 144),[15] remarked that, according to Avicenna, the dirty wool of the

[14]*The Greeks call the dirt and wool Oesypo, from which the Barbarian doctors, corrupting the word, came to call it Hyssopo, adding the nickname of Humida (...), although we also call Paulo Aegineta, Greek doctor, (Greek), which it is humid hyssop.*

[15]CIR 62r 21: *And in the ysopo that is made from the dirty wool in the dissolver you have very great fuzia but know that the suitable wool is from the cattle of the Egyptian land, which is very dirty (...) I want to say that in that written ruling [Aviçenista] that the wool must be from the land of Egypt.*

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best quality from the Egyptian cattle was extracted, since it had a dirt associated to the land type where it was grazing:

E en el ysopo que se faze de la lana sucia en el disolver tengas muy grand fiuzia pero sepas que de la conveniente lana es del ganado de la tierra egiçiana ca en aquella es mucha suziedad (…) *Quiero dezir que en aquel fallo escrito [Aviçenista] que la lana deue ser de tierra de Egipto.*

He also quotes Galenus, testifying to the dirty wool use or «ysopo» mixed with wine, a tradition that comes to us from Dioscorides. The medieval texts reflect the tradition inherited since antiquity of the dirty wool use and its fat, hyssop, in the medicine of the time (García & Solomon 1987; Ardemagni et al. 1984; Zabia 1987; Conerly et al. 1986; Herrera 1987). According Laguna testifies in her comments on the Dioscorides work:[16] *no sólo nos cubre, y defiende de la inclemencia del frío, la lana, empero también nos socorre conta muchas enfermedades, principalmente, la suzia.*[26]

To summarize, today, we know that keratin is a fundamental wool component. It is necessary for the sheep to produce wool. The source from which the keratin used in supplements is extracted is pure sheep's wool, a sum of the wool fiber intermediate filaments. These filaments are very similar to human hair and are beneficial when applying and caring for hair and skin. Keratin is normally insoluble. To obtain that this keratin is absorbed by the body, it must be subjected to a process by which it is solubilized, respecting the cysteine and other components integrity, to obtain a more bioactive and bio-available preparation.[27] For these reasons, punctually and locally it was thought that a wool fleece given to the sheep,[17] could increase the wool quality.[18] Considering all the wool therapeutic properties and its magical attributes it is logical to think of a homeopathic magic type: *Similia similibus curantur* (the like cures the like). A magic developed during Antiquity and among primitive peoples around the world and applied to ethno-veterinary knowledges. Thus, if a sheep ate wool, this resulted in the lamb or sheep giving a higher quality wool.[19]

Currently, they continue to make bracelets of a woolen thread with seven knots. According to the belief they protect from the evil eye. This bracelet will be effective while worn on the wrist. This must be carried until it breaks and must fall on its own.[28–46]

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Authors declare that there is no conflict of interest exists.

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[16] *Wool not only covers us and defends us from the inclement cold, but it also helps us against many illnesses, mainly dirt wool*

[17] Today we know that wool has proteins rich in cysteine.

[18] F. Aguiló, Andean anthropologist, takes up in Latin American literature the Andean legends that speak of a female sheep that ate wool and excreted yarn: we knew all this from the companions of ancient times. In the time of the "dizque" grandfathers knew with the kid how to find the spell (…) They also knew how to tell of the sheep grazing, that which knew how to steal, to the female sheep which knew how to eat wool (Aguiló 1985 : 300).

[19] Amon de Naukratis: Bassin of Brithis Museum (Ref. EA36856). Fragment of a massive basin, more specifically sha-basin, carved from dark grey basalt; figure of plumed Bes in relief and incised demotic text on the outer surface; damaged human figure on the top, remains only of the feet (priest or dedicant?); shallow basin (start of bottom visible) *cif.* Yoyyote

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