

# Aegyptus et Pannonia VIII.



Acta Symposií anno 2021

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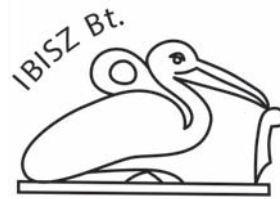
BUDAPEST

# Aegyptus et Pannonia VIII.

Acta Symposii anno 2021

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# Aegyptus et Pannonia VIII.

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## **“Plants for Health from Ancient Egypt to Present Day” Conference and the HEFS AEC**

**DR. HEDVIG GYŐRY PHD**  
HEFT AEC president

After the realization of the 2019 mummy conference, the need arose to discuss the new trends, methodologies and achievements in ancient materia medica from a phytotherapeutic point of view and to disseminate the results achieved by our in-depth research. With this conference, we also wanted to explore how many different ways there are to approach ancient plants and medicine, also from historical, cultural, religious, ethnographic and pharmacological points of view, and to compare it with other related fields. We also wanted to draw attention to other areas of research into plants that maintain and improve health. In this way, contemporary and historical treatments were juxtaposed, Egyptian, Hittite, Greek, Roman and later European herbal medicine, to mention only the most important regions studied in these proceedings. The conference was held in two languages, English and Hungarian, but all the articles in the proceedings are English. We hope that this way we can bring these issues to the attention of as many people as possible.

This time we have chosen to discuss the plants used for health problems. A significant proportion of the substances in ancient Egyptian prescriptions are of plant origin. Reviewing and studying their effects and data can also provide new opportunities for the current pharmacopoeia. Our group of doctors thought that there was a lot of new knowledge to be gained in this area worldwide, and that the knowledge of plants is becoming increasingly important, if we only think of the research into pathogens, many of which have adapted to synthetic drugs. We need thus new materials to use to eliminate them, and earlier medical practices may lead to the discovery of new active substances that are important for people today. Knowledge of these active ingredients makes it possible to apply these drugs as new medicines in a consistent quantity and quality. On the other hand, there are also many places where conditions do not allow the use of drugs produced by modern technology, but nature can help patients with its often hidden treasures. In addition to pharmacological research, folk remedies studied by ethnomedicine

and historical medical research play an essential role in getting to know them.

The HEFS AEC partly organizes its activities in cooperation with other organizations – the above-mentioned international workshop of the Nephthys project in 2022 was co-organized by the Hungarian Natural History Museum, while this very conference took place in partnership with the HNM Semmelweis Museum of Medical History, whose members gave several lectures on historical medicine and modern ethnomedicine, and where a special chamber exhibition would have welcomed the participants in honour of the conference, if the COVID had not prevented the organization of a face-to-face meeting. Nevertheless, we were able to offer the possibility of discussions and consultations in special virtual chambers, allowing the exchange of professional experiences.

The HEFS AEC has published these new proceedings, this time in two volumes (Aegyptus et Pannonia VII-VIII), containing more than half of the papers presented at the conference: “Plants for Health from Ancient Egypt to Present Day”. As we focused on our main research topic in the Medical Research Group of the HEFC Ancient Egyptian Committee, we wondered what the scientific community thought about the ancient Egyptian use of plants in various fields of human and natural sciences, the continuity of related knowledge, and the implications and possibilities of these ancient practices for people today. We also wanted to present the ideas we had developed and the results we had achieved in the professional field, and to provide an opportunity for specialists to discuss different topics. In terms of the structure of the proceedings, we have returned to the previous method of the series, so that the articles are once again listed in alphabetical order of authors, rather than by subjects

#### **THE HEFS ANCIENT EGYPTIAN COMMITTEE AND THE MEDICAL HISTORY**

The HEFS, which has been operating since 1995, carries out several activities in the tradition of its earlier activities: the general programs focus on the last five thousand years, selecting interesting and important topics, while the work of the AEC is mainly directed in three directions. An important objective is (1) the cultural transmission and dissemination of knowledge about ancient Egyptian culture through lectures and public meetings for interested adults, also in the framework of the Hungexpo. We also organise (2) artistic and handicraft activities, workshops accompanied by discussions on various topics with children, launching every year a fine arts competition (drawing/painting), the results of which will be exhibited for the third time in January 2023 in the Deák 17 Children’s and Youth Art Gallery of the Budapest History Museum; and (3) following scientific and scholarly research into the use of ancient objects, human and animal remains – including an international event of the Nephthys Project in 2022 – and medical history, concentrated on phytotherapy and surgery.

As far as our material at the conference is concerned, we present here as a starting point our research focused primarily on the use of plants in surgery, if only because several members of the group are doctors from the Department of Surgical Research and Techniques at the Faculty of Medicine in Semmelweis University, Budapest. The first scientific results of this new direction are published of today's surgical tools and materials. Thus our conference papers focus on the ancient Egyptian surgery from the point of view of the application of plants in these volumes, but research is also being carried out in other areas. Firstly we present research in the direction that is mainly focused on comparative analysis, directed towards the ancestors surgical kit, the plant materials used for wound care and the general knowledge of ancient Egyptian surgeons, with a view to the surgical culture of other peoples and periods or the use of pharmacognostic knowledge. We have also considered it essential to investigate into possible reasons for the use of plants, which may allow us to consider modern phytotherapeutic applications.

Two other areas of our phytotherapy research are also represented in these volumes. The origin and treatment of various diseases throughout the world, and especially in ancient Egypt, is also an interesting topic. In this direction, we have chosen to focus one disease in particular. Diabetes is one of the most widespread diseases of our time, and we have chosen to study its ancient treatment methods. In this case, as in the case of surgery, we have compared several cultures to find out the ancient knowledge and problem-solving methods, and have pointed out herbs that are officially used in the world, or in Hungary.

Another problem of our time, seemingly far removed from the history of medicine, is the conservation and preservation of biodiversity, which is affected not only by climate change and other natural factors, but also by human activity. This phenomenon can be traced back even to ancient Egypt, although the process has accelerated in the last hundred years. One of our topics in this respect is presented here, showing how an ancient curiosity herb has become a plant of large-scale production in the 21<sup>st</sup> century, and saving this way the species from extinction.

A new direction of the group is the study of the history of Hungarian phytotherapy in partnership with the Semmelweis Museum for Medical History. We have just taken the first steps in this direction, but we can already say that the classical Roman authors, and the ancient Egyptian knowledge they transmitted also played an important role in official medical practice and influenced folk medicine in our country. It seems that the herbaria published in Hungarian language played a key role in this process.

The interweaving of contemporary and historical issues characterizes many of the articles in the volumes. At the same time, mutual influences, shifts of emphasis and reinterpretations within the ancient world, or elements of later historical periods that reach into the past or present, play a prominent role. In this field, it is essential to collect and examine the sources from a new perspective in order to obtain a clearer picture of certain details of the past. Historical, artistic, literary, religious, economic, museological, pharmaceutical, phytotherapeutic, ethnobotanical or even chemical points of view appear in individual articles. It has been proven that the ingredients listed in many of the ancient Egyptian recipes studied so far can still be used as effective medicines today.

This volume contains 16 contributions on the role of drug use in different periods. There are chapters on the reconstruction of some ancient Egyptian remedies, on the ancient method prescribed for the preparation of antjw ointment, or on the preparation and action of kyphi, and pelargonium, traced through biochemical and experimental research; Others are devoted to the materia medica used in Hungary over the centuries, or to the comparison of contemporary Egyptian folk medicine and pharaonic materia medica in the field of gynaecology; another is devoted to studies on the possible identification of magical Egyptian plant names with a dominant connection to the moon, or to the ritual and non-ritual use of some plant substances with religious names in Egypt. Others relate to the popular treatment of diseases such as tuberculosis and cholera in Hungary, or which edible plants have been identified in Coptic medical therapies. Sedative plants are also featured in the current volume, and a plant closely associated with a butterfly is discussed. Another article focuses on the pomegranate, with its many meanings as a symbol of fertility and female power. Yet another focuses on the worldwide surgical use of plants, while others discuss the balance between practical and religious beliefs in the use of medicinal plants. The pop-up exhibition for the conference is briefly introduced, hinting at the museological aspect of medical history.

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We would also like to express our gratitude to all those colleagues and volunteers who have shared their expertise and offered their generosity by providing scientific or linguistic proofreading for these volumes.

Thanks are also due to the active participation of Aquila Design, who coordinated and realized the editing and printing and to our financial supporters, the Hungarian Natural History Museum, the Ibisz Bt. and the Kiss Ferenc a Növényi Biodiverzitásért Alapítvány [Kiss Ferenc Plant Biodiversity Foundation], whose aim is to raise awareness of the natural treasures we have and to try to teach people to use them, rather than abuse them.

# “REMEDY PREPARATION” SKILLS OF EGYPTIAN PHYSICIANS: PLANTS TRANSFORMATIONS, VEHICLES AND GALENICS

YASMINE SRIDI

Independent scholar

## ABSTRACT

The article is part of the research axis of “Herbal medicine and present-day medicine”: it intends to analyse the “remedy preparation” skills of Egyptian physicians in the light of the knowledge and practices of modern herbalism. Herbal medicine has multiple ways of extracting the active substances of medicinal plants and of applying the resulting preparations:

Firstly, I focus on the extraction of active principles: nowadays we can resort to various methods using infusion, tincture, tonic wine, or medicinal oil. We note that extraction is always done with a solvent, a carrier substance, that must be chosen based on its physicochemical affinity with the active principle required: hydrophilic, lipophilic, etc. However, we realize that – without knowing or even being aware of the biochemical composition of the plants they used – Egyptian physicians had already set up a number of these processes: water (dew), alcohol (wine, beer), oil, but also milk and honey. A study of lists of remedies, the Ebers papyrus for example, will make it possible to systematize the transformations applied to the plants. I present the numerous vehicles – *mw*, *hnk.t*, *irp*, *mrh.t*, *irt.t*, *bi.t* – and their uses.

Secondly, I present how these active substances were administered: today’s herbal medicine has recourse to an arsenal of galenic forms such as capsules, ointments, cataplasms, inhalations, ... Once again, an analysis of Egyptian medical texts allows great understanding of the possible applications of the various remedies and, by extension, great skills in their preparations. To become aware of this reality, archaeological reconstructions will demonstrate the “very modern” character of these medicinal preparations. The Ebers papyrus and the remedies which were explained in it are also the ground material for this part of the paper.

**KEYWORDS:** Egyptian physicians, herbal medicine, remedy preparation, vehicles, galenics, archaeological reconstructions

## **INTRODUCTION**

My conference proposes to analyse the skills of Egyptian physicians as “remedy preparers” in the light of modern knowledge and practices. For this purpose, I use my expertise as Egyptologist and herbalist to investigate the procedures of transforming plants, using solvent and also choosing the right administration form for a remedy (described in medical papyri such as Papyrus Ebers<sup>1</sup>).

While these written sources have been extensively discussed – in form as well as in substance – few<sup>2</sup> have been interested in remedies in their practical dimension, i.e. in the technical realisation. However, this is a part of the Egyptian medicine history: what modern science calls “pharmacology” or more precisely “galenic pharmacy”<sup>3</sup> is an almost unexplored field of Egyptian therapeutics.

The presentation is divided into two parts: the first one focuses on the preparation of remedies, modern as ancient, from a theoretical point of view, and the second part puts this theory into practice, through experiments of historical reconstruction of remedies.

## **PART 1: THE TRANSFORMATION OF PLANTS IN THEORY**

Currently, herbalism has several methods for processing medicinal plants. The actual physicians adapt the means of extraction to the active substances they contain: depending on the active ingredient we are looking for; the technique may change and require different adjuvants. The administration of these preparations is also studied from the point of view to be suitable for the specific application depending on the area or the type of pathology to be treated.

### **1. ACTIVE INGREDIENTS OF MEDICINAL PLANTS**

Let's first look at the active ingredients. The potential of medicinal plants is obviously related to the active biochemical molecules they produce.<sup>4</sup> Before the expansion of the pharmaceutical industry in the twentieth century and the emergence of synthetic chemistry, these active molecules were

1 The longest medical papyrus known today, the Ebers Papyrus is dated to the reign of Amenhotep I, around 1500 BC. NUNN 1996, 30-34.

2 For example, studies of Jacqueline CAMPBELL, Ibrahim ELTORAI, Lise MANNICHE, Tanja POMMERENING who – in addition to the pharmacopeia and the different branches of Egyptian medicine – are interested in the procedures of creating remedies.

3 Must be understood in the sense of the study and the art of preparing an active ingredient to make it administrable to the patient in a form called “galenic”.

4 CHEVALLIER 2019, 14-16

extracted (from producing plants, from picking or cultivation<sup>5</sup>) and used in medicine. Herbalism (or phytotherapy) has therefore remained close to this health movement since it continues to use “raw” plants – called “drugs” –, as material for its preparations.

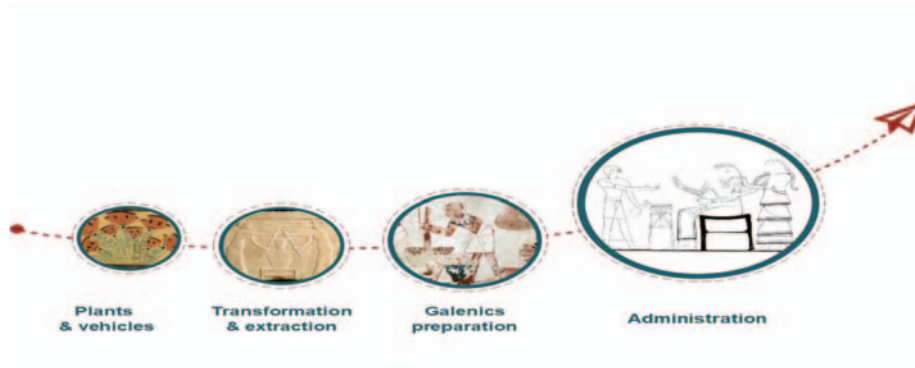


Figure 1. Remedy fabrication process (personal diagram)

Without knowing or even being aware of these biochemical realities, the Egyptians did the same: their medical knowledge and awareness of this potential of medicinal plants were learned through experience, probably first transmitted orally before being written down on the papyri.

However, in practice, it is difficult to identify with certainty which medicinal plants but also which parts of them were used by Egyptian physicians (for translation considerations among others).<sup>6</sup> There is unfortunately a lack of information about their remedies and, of course, about effectiveness of their medicines. Indeed, the active ingredients and their concentration are variable: depending on the producing organ of the plant, the biotope, the harvest or the picking season, ... The concentration, or even the dominant active molecules, can be different; this is called the “chemotype”<sup>7</sup>.

5 We have little information about the supply of raw materials to Egyptian physicians, see NUNN 1996, 138-139. To get the plants they needed, we can hypothesize that they had several supply channels: the gathering wild plants (indigenous or acclimatized), cultivation in gardens of medicinal plants and purchase of plants from trading partner regions.

6 NUNN 1996, 151; POMMERENING 2006, 103-112.

7 In aromatherapy, “chemotype” or “chimiotype” refers to the biochemical identity of the plant. Analyzed by gas chromatography and mass spectrometer, essential oils or plant extracts (which produce essential oils) reveal different biochemical specificities. Depending on the parameters to which the plants were exposed during their growth, the secreted active molecules and their concentrations vary within the same species. Among these parameters, we note – among others – the biotope, altitude, hygrometry, light intensity but also the vegetative stage and the harvest

### 1.1. VEHICLES: CHOICE OF A SOLVENT

It is good to have the plants, but you still need to be able to have access to the active ingredients! Today, several methods exist to extract all these active molecules from plants: infusion, tincture, tonic wine or medicinal oil.<sup>8</sup> Through these techniques, we observe that the extraction is always done through a solvent, a carrier substance. It is chosen according to the physico-chemical affinity with the active ingredient sought: hydrophilic or lipophilic, for example. The vehicle will therefore be aqueous, alcoholic or fatty.

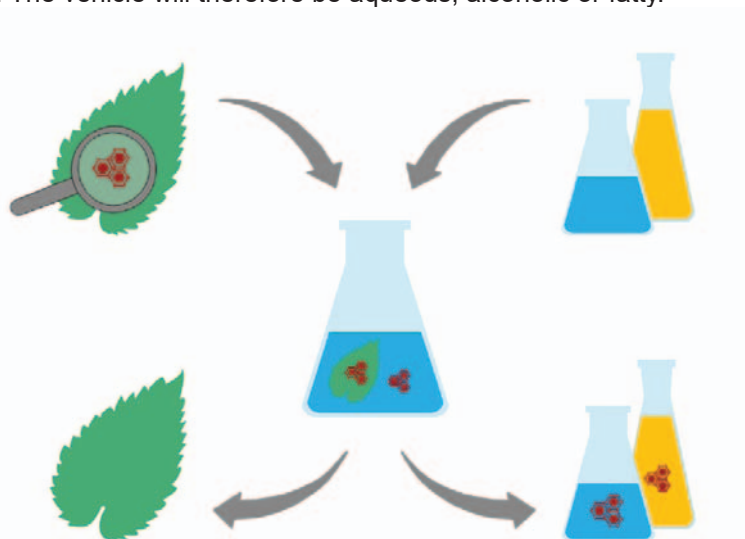


Figure 2. Extraction of plant active ingredients in a liquid solvent (personal diagram)

However, we realize that – without knowing, or even being aware of the biochemical composition of the plants they used, Egyptian physicians have already experimented with a number of these solvents.<sup>9</sup>

The study of lists of remedies such as the Ebers Papyrus<sup>10</sup> makes possible to identify many vehicles already known at the time. Water (*mw*,  $\overline{\text{mw}}$ ), alcohol (wine - *irp*  $\overline{\text{irp}}$ , beer - *hnk.t*  $\overline{\text{hnk.t}}$ ), vegetable or animal oil<sup>11</sup> (*mrh.t*,

season. BRUNETON 2017; FAUCON 2019, 76-89.

8 CHEVALLIER 2019, 290-297.

9 NUNN 1996, 139.

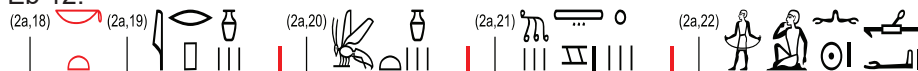
10 All the following recipes are based on the edition of the Ebers Papyrus as published by LALANNE– MÉTRA 2017.

11 NUNN 1996, 149.





Eb 12:




*k.t. jrp 1, bj.t 1, šnj-t3 1. sh3k(=w) wnm(=w) n hrw w<sup>c</sup>.*

*Other (remedy): wine 1, honey 1, sheni-ta fruit 1. To filter and ingest in a single day.*

#### OIL AND FAT

Oil and fat could be extracted from vegetable or animal sources. The vegetable oil used in remedies is rarely specified. The olive oil was introduced by the Greeks, so it could not be used as a solvent in the early periods of Egyptian history; it seems that the first attestation was around 1350 BC.<sup>21</sup> That is also the same for the linseed oil, which seems to have been introduced in the Ptolemaic period.<sup>22</sup> On the other hand, moringa oil, the oil of the desert date palm (*ished*) or the *sefet* oil (possibly extracted from pines, the <sup>š</sup> tree)<sup>23</sup> are more frequent. Castor oil is also mentioned as an active ingredient in some remedies.

As for animal fat ()<sup>24</sup>, it is used for the preparation of ointment, for example.<sup>24</sup> It is made of antelopes, donkeys, fish, geese, ostriches, ox, sheep and even mouse fat!<sup>25</sup>

Eb 107:



*ky gsw: dkw n d3r.t, dkw n jwrj.t, nstjw, s3-wr; b3k, mrh.t w<sup>c</sup>b.t. gs(=w) jm(=s) r hrw 4.*  
*Other ointment: carob powder, bean powder, nestju plant, sa-wer resin, moringa oil, pure fat. To anoint 4 days with this.*

#### MILK

Milk is also commonly used in the preparation of Egyptian remedies. It can be of several kinds: cow, donkey or even human.<sup>26</sup> In addition to its vehicle interest, milk is found in some recipes where it seems to play the role

21 MANNICHE 1999, 31.

22 MANNICHE 1989, 116.

23 NUNN 1996, 140.

24 NUNN 1996, 148.

25 NUNN 1996, 150.

26 NUNN 1996, 148.

of a flavour, masking ingredient or – at least –, a facilitator of oral consumption.

Eb 309:



k.t. *d3r.t* 1, *bnr* 3g(=w) 1, *hnw n jrt.t. swj*(=w)

Other (remedy): carob 1, crushed dates 1, a hin of milk. To drink.

### HONEY

Honey is known from the beginning of Egyptian history, since the first written traces date back to nearly 3000 BC.<sup>27</sup> It is therefore quite normal that this product of the hive – as well as others, such as wax or propolis – have been used in everyday life as well as in medicine since the Old Kingdom. As mentioned above, it is a safe bet that some vehicles were used on the one hand as a solvent and on the other, as an active ingredient itself; this is probably the case for honey. It can sweeten the preparations, serve as an active ingredient and be a carrier of other active ingredients which could be used both orally and dermally.<sup>28</sup>

Eb 239:



k.t. *jbw* r-64, *š3w* r-16, *thw3* r-64, *š3ms* r-16, *m(j)m(j)* r-16, *š3š3* r-8, *bj.t* gs. *ps*(=w) *wnm*(=w) *tp*-<sup>c</sup> *sdr*.

Other (remedy): ibu plant 1/64, coriander 1/16, peas 1/64, pyrethra 1/16, spelt mimi 1/16, valerian (?) 1/8, honey 1/2. To be cooked and ingested before going to bed.

### 1.2. EXTRACTION METHODS

Once the most suitable vehicle for an active ingredient has been identified, the extraction as such must be carried out. This step can be done both hot or cold: hot, as it is the case for an infusion or decoction, or cold, like macerations. This choice is decisive for the quality and the potential of the finished product: indeed, some active substances can be sensitive to heat, or even change their biochemical composition at a given temperature.<sup>29</sup> It should

27 The hieroglyph of the bee appears in the royal name since the Old Kingdom. In addition, some administrative titles of that time already seem to refer to beekeeping (cf. “Sealer of the honey”). KRISTSKY 2015, 7.

28 NUNN 1996, 148.

29 BRUNETON 2017, 731-732.

also be noted that – in addition to heat and the vehicle – certain transformations of plants make it possible to improve the extraction of active ingredients. This is the case, for example, when cutting or grinding drugs; this allows an easier release of the active ingredients that compose it.



Figure 3. Scene of plant transformation and ointment making from oily maceration (?) [TT 175, North wall, 2<sup>nd</sup> register © Photo by Bruno Sandkuhler – Uni-Dia Verlag and © Photo editing by Thierry Benderitter for Osiris.net]

As demonstrated by various studies on Egyptian pharmacology and lists of remedies,<sup>30</sup> the Egyptians seem to have a great mastery of different methods of processing plants but also of extraction of active molecules. The verbs used in medical papyri suggest the diversity of transformations possibly applicable to raw drugs: in addition to the traditional and “passe-partout” *ir* (𓂏) to designate the fact of “making” or “preparing” the remedy, we also find grinding (*nd*, 𓂏𓂏), cooking (*ps*, 𓂏), pressing or filtering (*th*, 𓂏𓂏), ...<sup>31</sup>



Figure 4. Two men prepare a liquid substance. One mixes or cuts and the other filters. [TT 175, North Wall, 2<sup>nd</sup> register ©Photo by Bruno Sandkuhler – Uni-Dia Verlag]

30 CAMPBELL 2008, 223.

31 NUNN 1996, 139.

## 2. GALENICS: FORMULATION AND PREPARATION OF REMEDIES

Formulation and preparation correspond to a key point between extraction and administration; it fully reflects the competence of the preparer who works on it. It is, in fact, at the crossroads between the quality goal, essential in the extraction phase, and the practical aim of the administration of the galenic.

At the end of the previous step, the herbalist or the remedy preparer obtains an aqueous, alcoholic or fatty substrate, containing the active ingredients of the initial medicinal plant. Now, it is necessary to consider the “galenic”, the final form that the remedy will take. This must be appropriate to the area or the type of pathology to be treated. Current herbal medicine uses an arsenal of these so-called “galenic” forms such as capsules, ointments, poultices, inhalations, ...<sup>32</sup>

Once again, the analysis of Egyptian medical texts demonstrates a great understanding of the possible applications of the different remedies and, by extension, a great mastery of their preparations. Concretely, the Egyptian preparer must – among other things – handle:

- Techniques for the possible mixing of aqueous and oily phases
- Texturing techniques
- Stabilization techniques
- Processes for preserving the mixture

The formulation of the remedies will therefore include the active substances obtained as result of solvent extraction, the vehicle itself, but also certain adjuvants texturizing or allowing a better intake of the final galenic (cf. ingredients for masking the taste, flavouring).<sup>33</sup> This will be accompanied by practical indications relating to the realization of the remedy.<sup>34</sup>

Eb 15:



*k.t: w3dw 1. nd(=w) sn<sup>c</sup>(=w) rdi(=w) m bj.t n(j).t t, jri(=w) m swj.t 3 s<sup>c</sup>m jn s. s<sup>c</sup>m(=w) m h(n).k.t ndm.t.*

*Other (remedy): malachite 1. To be ground finely and placed in a piece of bread, to be formed into 3 pellets to be swallowed by the man. To let be swallowed (i.e. absorbed) with sweet beer.<sup>35</sup>*

32 CHEVALLIER 2019, 290-297.

33 CAMPBELL 2008, 221.

34 For the measurements report at POMMERENING 2006, 103-112.

35 In this example, the beer comes at the end of the formulation, in a phase of posology. We can

### 3. ADMINISTRATION AND DOSAGE

Apart from intravenous and intramuscular treatments, the Egyptians already seem to have dominated all the other routes of administration used in modern herbal medicine: oral, cutaneous, rectal or vaginal, inhalation or fumigation.<sup>36</sup> Again, the vocabulary used in medical papyri such as the papyrus Ebers, teaches us a lot about the possible administrations of a remedy: to eat (*wnm*), to drink (*swj*), to pour or place in the anus (*wđh*, *rdi*), to coat or anoint (*gs*) or to administer by fumigation (*k3p*).

The recipe ends with an indication of the route of administration by which the patient should take the remedy, accompanied by brief information about the dosage and often the duration of taking it.

### PART 2: THE TRANSFORMATION OF PLANTS IN PRACTICE

After the consideration of the theoretical concepts in the first part and in order to test the skills of Egyptian physicians as “remedy preparers”, it seems useful to resort to archaeological reconstructions. The goal is to evaluate the feasibility and effectiveness of the manufacturing processes of the medicinal preparations that have reached us through papyri. The Ebers papyrus and the remedies explained therein are also the main source of this part. Three extractions are carried out: an aqueous extraction, an alcoholic and an extraction in a fatty substance.



Figure 5. Doctor Nebamon giving a remedy, in liquid form, to a Syrian patient and his wife (?) [TT 15©Drawing by Norman and Nina De Garis Davies, Metropolitan Museum, MSS 10.7]

easily understand that beer is not used here as a vehicle to extract any active ingredients, but as help to take the remedy, just as we make nowadays by swallowing a pill.

36 NUNN 1996, 143.

**1. EXTRACTION IN AN AQUEOUS SOLVENT**

The first extraction is made by an aqueous vehicle, namely water. In this recipe, the remedy preparer must mix figs, ochre, and gum into water:

Eb 230:



*k.t: hr.w-<sup>c</sup> n srwh ḥ3.tj m wn-m3<sup>c</sup>: d(3)b r-8, stj r-16, kmy.t r-32, mw 15 rq. mj.tt*

*Other (remedy): herou-â medicine to truly treat the haty-heart: figs 1/8, ochre 1/16, gum 1/32, water 15 ro. (To be used) in the same way<sup>37</sup>.*

What we can observe by reading the instruction of the recipe is that the physician has already a good comprehension of the solubility of the ingredient and so an empiric knowledge of how using this kind of ingredients. Indeed, gums – the Arabic gum for example – have some affinity with aqueous solvent and so can be used in water, as it is done here.

However, regarding the indication for the preparation, the recipe is very poor: we have the ingredients and the vehicle, but we know nothing about the extraction itself. Is it a cold or hot extraction? How long does this extraction lasts?

The only evidence we can base on is the fact that gum must be cooked in water to be dissolved. That is the hypothesis that has been followed here.

As the reproduced Eb 230 recipe proves, the gum has been completely dissolved in warm water. Then, mixed figs and ochre were easily added by the water. After filtering, the drink reminds of some clay remedy drinks which are still used today.

In conclusion, following the hypothesis of warm water, it was probably the ancient way to prepare this remedy and it confirms the solubility knowledge of the Egyptian physicians.

37 Reference to the recipe Eb 226, which recommends filtering the ingredients and drinking the remedy before going to bed.

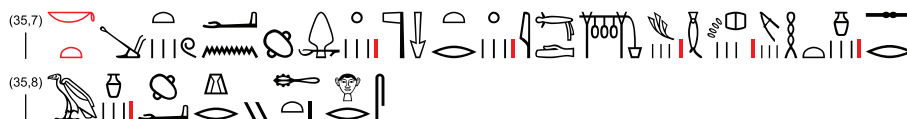


Figure 6. Extraction in an aqueous solvent (personal picture)

## 2. EXTRACTION IN A FATTY SOLVENT

The second extraction is made in oil and is translated as following:

Eb 177:



*k.t: pr.t w<sup>c</sup>n 1, snr 1, jšd 1, bnr 1, mrḥ.t 1, srm.t 1. wt(=w) hr:j ḥ.t ḥr = s*

*Other (remedy): juniper berries 1, frankincense resin 1, ished fruit (fruit of the desert date palm) 1, dates 1, oil 1, date drink 1. Bandage the lower abdomen with this.*

Unlike what has been said about gums, the modern herbalism recommends using resins (like frankincense) in alcohol because of the affinity of resin with alcoholic vehicles. In this case, resin and other ingredients are prepared with two liquids: a non-specified oil and a date drink. If the date drink is alcoholic, it could follow the modern process; if not, we must look for another hypothesis. This hypothesis could be to consider that it is not a real extraction at all: if we suppose that it is just a mixing of several ingredients, they do not have to present solubility affinity.

The galenic form would also be in question: the recipe prescribes to use the preparation as a bandage. It supposes that it is not too liquid, rather a thick texture; we can imagine a poultice or a cataplasme.

Once again, except for the ingredients and the vehicle, we can note that we do not have much information about the extraction itself (temperature, time, ...).



Figure 7. Extraction in a fatty solvent (personal picture)

As shown here before, the ingredients could be ground one after the other and mixed to make a thick substance which we can easily smear the skin with. This reconstruction teaches us that the solubility does not play any role in this recipe; in this case, liquids are more of a support for administering galenic than a real solvent in an active ingredients' extraction.

### 3. EXTRACTION IN AN ALCOHOLIC SOLVENT

This third recipe is probably the easiest to reproduce because we have all information we need:

Eb 92:



*k.t n(j).t šd.t wh3.w m h.t sm3=f r-pw : d(3)b r-32, hm3.t mh.t r-8, t w3d r-8, h(n)k,t ndm.t 25-r. ps(=w) sh3k(=w) wnm r hrw 1.*

*Other (remedy) to extirpate ouhaou that are in the body or to kill them: figs 1/32, Delta salt 1/8, fresh bread 1/8, sweet beer 25 ro. To be cooked, filtered and ingested in one day.*

In this recipe, we know the ingredients and the vehicle (sweet beer), we are informed that we are supposed to cook everything together and we also have the posology (drinking the galenic in one single day). Due to all this information, the realisation of this recipe seems somehow to be the easiest of the three chosen experiences:



Figure 8. Extraction in an alcoholic solvent (personal picture)

As confirmed in this reconstruction, it is simple to cook all ingredients together and to let them infuse. The flavours seem to be well extracted but without testing the concentration in active principles present in the final galenic, we cannot estimate the effectiveness of the extraction.

## CONCLUSION

### **WHAT ARE THE SKILLS OF EGYPTIAN DOCTORS AS “REMEDY PREPARERS”?**

*What does modern herbalism teach us about ancient practices?*

There is no doubt about the fact that these remedies show ignorance of certain physiological or biochemical functioning. Although these

empirical knowledges are influenced by magico-religious beliefs, it would be presumptuous – and also wrong – to think that remedy preparers of pharaonic Egypt only manipulated ingredients at random.

If we consider the technicality of the practices in place during pharaonic Egypt, we realize that they are close to our modern procedures. Extraction or administration techniques – for example – have certainly evolved with the improvement of scientific knowledge, but the basic practices have remained the same:

- Among the transformations applied to plants, we always find macerations and solvent extractions.
- In terms of drug treatment, drying, cutting or grinding utensils have been automated, making it possible to mechanically carry out the acts already mastered by the preparers of remedies.

#### ***WHAT ARE THE RESEARCH PROSPECTS IN THE FIELD?***

The present paper does not claim to be more than a gateway, an introduction to this world of technicality, somewhat neglected in the study of Egyptian pharmacology. Only further in-depth research into the occurrences of drugs, solvents and their associations in Egyptian remedies will make it possible to systematize the transformations applied to plants.

This approach – combined with experimental archaeology – would allow a better understanding of the different prescriptions and their uses. It would also make it possible to refine our understanding of medical sources and thus their translations.

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