

Madeleine Kerkhof & Kicozo

Retired Nurse, now aromatherapist, hydrotherapist, massage therapist, specialist in Integrative Nursing (spec. wound care, oncology, palliative and elderly care, pain management). Accredited by & advisor to the section IM of Dutch Board of Nurses, member of many professional bodies, Fellow of ICAN). Educator, world wide speaker & author of: "Complementary Nursing in End of Life Care" (2015); "CO2 Extracts in Aromatherapy " (2018 English); "Clinical AromaCare (2023); Many papers; Dutch National Palliative Care Guidelines (2023)

www.kicozo.info



Flower power

Plants and plant extracts have been used for skin wound healing as long as we are around. Fossil records show that the human use of plants as medicines may be traced back at least 60,000 years (Yuan et al., 2016). Using plants is perfectly natural given the fact that the age of modern pharmaceuticals didn't start until the mid 1800's. Until this day many pharmaceuticals have their roots in plant medicine.

www.kicozo.info



Flower & plant power: from wrap to paste

Wrap around leaves such as cabbage leaves, poultices with crushed roots such as comfrey, macerates, resins or herbal pastes were, and still are, part of traditional wound healing. This was especially so in rural area's where people had (very) limited access to medical or pharmaceutical assistance, and who relied, and rely to this day, on plant-derived medicine for their health (Das et al., 2014). They were most often found locally and could differ from country to continent or culture.

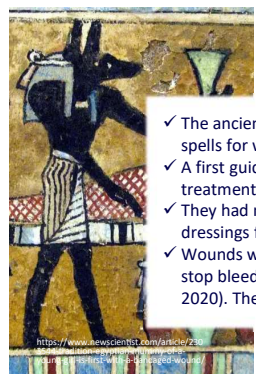
www.kicozo.info



From tradition to modern times

- ✓ In Mesopotamia (around 2600BC) tablets in cuneiform disclose the existence of pharmacologically formulated substances such as Cedrus spec., Commiphore spec., Cupressus sempervirens and Papaver somniferum (Poppy) juice.
- ✓ These herbs are still in use for medicinal purposes, including wound-related infections and inflammation (Das, Behera & Pramanik, 2017).

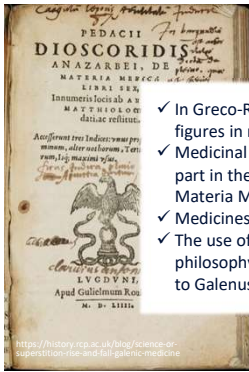
www.kicozo.info



From tradition to modern times

- ✓ The ancient Egyptians used manual interventions, drugs and spells for wounds.
- ✓ A first guide was the Edwin Smith papyrus (1500BC) on the treatment of traumatic wounds.
- ✓ They had no concept of contagion, yet changed dirty dressings for clean ones every day.
- ✓ Wounds were treated with ointments with ostrich shell to stop bleeding, and willow to draw out heat (Brocke & Barr, 2020). They also used sugar and honey.

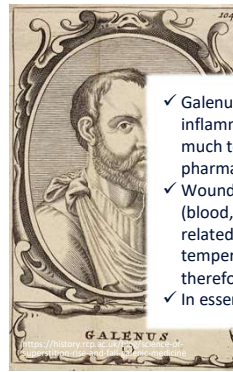
www.kicozo.info



From tradition to modern times

- ✓ In Greco-Roman times, Hippocrates and Galenus were key figures in medical treatments.
- ✓ Medicinal plants and herbs were an important and major part in the pharmacopeia. Dioscorides, a Greek, wrote his Materia Medica in 65 AD (Hajar, 2012).
- ✓ Medicines were made from herbs, spices, and resins.
- ✓ The use of herbs also drew on the doctrine of signatures, a philosophy shared by herbalists from the time of Dioscorides to Galenus (Hajar, 2012).

www.kicozo.info



From tradition to modern times

- ✓ Galenus described the four classic symptoms of inflammation (redness, pain, heat, and swelling) and added much to the knowledge of infectious disease and pharmacology (Hajar, 2012).
- ✓ Wounds were connected to imbalances in the 4 humours (blood, yellow bile, black bile, phlegm) who were closely related to the seasons, the planets, body parts, individual temperament and personality, and stages of life, and which therefore required local and systemic treatment.
- ✓ In essence Galenic medicine was truly holistic avant la lettre.

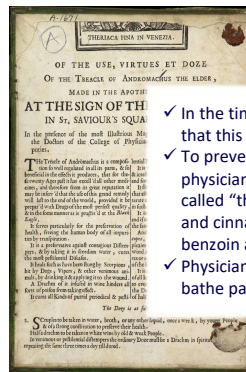
www.kicozo.info



From tradition to modern times

- ✓ During the Middle Ages, wound care became a major aspect of the care of the wounded and ill.
- ✓ Nuns and monks provided that care, often using herbal remedies and other natural treatments.
- ✓ Wounds were cleaned, most often with vinegar as it was believed that it would kill disease.
- ✓ Mint was used in treating venom and wounds. Myrrh was used as an antiseptic on wounds (Hajar, 2012).

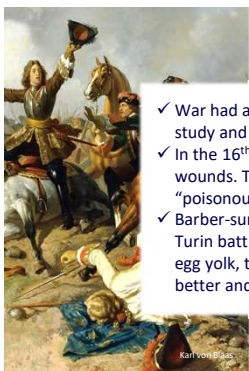
www.kicozo.info



From tradition to modern times

- ✓ In the time of the Black Plague (14th century), it was thought that this disease spread through "miasma's".
- ✓ To prevent the poisonous vapors to enter their own bodies physicians wore masks containing a medicinal concoction called "theriac", with herbs believed to be iris, ginger, cassia and cinnamon, rose, lavender, myrrh, clove, St. John's wort, benzoin and (frank)incense.
- ✓ Physicians relied on blood letting and boil-lancing and would bathe patients in vinegar and rose water (Hajar, 2012).

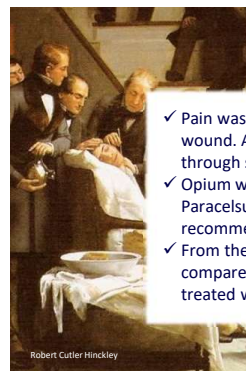
www.kicozo.info



From tradition to modern times

- ✓ War had always been an excellent "teacher" for surgeons to study and treat traumatic wounds.
- ✓ In the 16th century guns were invented, with associated wounds. To cauterize the wounds and neutralize the "poisonous" gun powder boiling oil was poured over them.
- ✓ Barber-surgeon Ambroise Paré, faced with a lack of oil in the Turin battle of 1537, chose an old Roman remedy: a mix of egg yolk, turpentine and rose oils: wounds healed much better and with much less pain (Park et al., 2022).

www.kicozo.info



From tradition to modern times

- ✓ Pain was one of the most burdensome symptoms of a wound. Alcohol was given to patients to help them get through surgery or wound care.
- ✓ Opium was described as early as 3400BC. The use of Paracelsus' laudanum was introduced in 1527 and recommended for pain by Thomas Sydenham in 1660.
- ✓ From the 1840's anesthesia was introduced, a great relief compared to the enormous numbers of patients that were treated without much pain relief (Brown, 2017).

The first successful public demonstration of ether at Massachusetts General Hospital, 1846 in the "Ether Dome."

www.kicozo.info



From tradition to modern times

- ✓ In the 19th century, nursing evolved into a profession, and wound care became a specialized area of expertise.
- ✓ Florence Nightingale (1820-1910) developed modern wound debridement of wounds and emphasized the need for (environmental and hand) hygiene and clean dry dressings to prevent wound infection.
- ✓ She also used lavender oil to calm wounded soldiers during the Crimean war and thereby promoted healing (Gnatta et al., 2016)

www.kicozo.info



From tradition to modern times

- ✓ Nicholas Culpeper advises Turner's Cerate in his "Physician and Family Dispenser" (1849), an ointment made of olive oil, yellow wax and calamine (zinc and iron oxides) for itch and pain of deep burns.
- ✓ Because it was only available on request at pharmacies, it was advised to perform first aid burns with an egg whipped into sweet oil. Gangrenous burns were treated with spirit of camphor, or tinctures of myrrh resin and bark

www.kicozo.info

Phenol

CAS Number
108-95-2

A13-01814; Benz
Carbolic acid; Cas
Hydroxybenzene
hydroxybenzene;
NCI-C50124; Oxy
Phenic acid; Pher
Phenyl hydrate; F
Phenyl hydroxid
alcohol;

EPA Pesticide Code: 064001

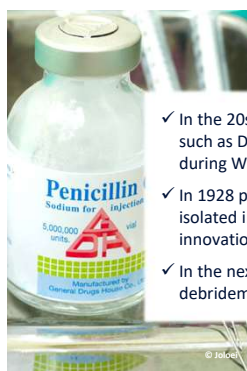


From tradition to modern times

- ✓ Joseph Lister used phenol (known at the time as carbolic acid) as a disinfectant in the 1860's. He would sterilize the operating theatre and surgical tools with it, and even soak bandages in the substance before dressing wounds.
- ✓ Phenols are well researched constituents of essential oils such as eugenol, thymol and carvacrol (Kerkhof, 2023).



www.kicozo.info



From tradition to modern times

- ✓ In the 20th century we see the rise of better antiseptics, such as Dakin's solution and Acriflavine which were used during WWI, and also carried in nurses' kits during WWII.
- ✓ In 1928 penicillin is discovered by Alexander Fleming. It was isolated in 1940 and widely embraced as the latest innovation in infection treatment.
- ✓ In the next decades wound dressing materials, antiseptics, debridement and quality of wound care kept improving.

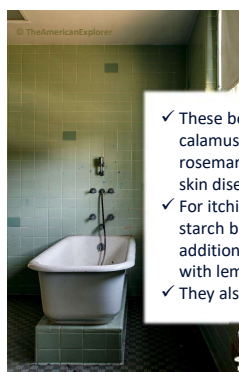
www.kicozo.info



From tradition to modern times

- ✓ In (Dutch) nursing books from the 1940s and 1950s (Melk, 1949; Stumpff, 1939) we find tar ointment, boron vaseline, cod liver oil, dermatol (bismuth), zinc ointment or oil.
- ✓ Also recommended is antiphlogistine, a paste consisting of pipe clay (a bluish clay), glycerin, camphor and the oils of eucalyptus, peppermint and wintergreen.
- ✓ Peru balsam (rich in benzoic and cinnamic acids) is another popular antiseptic and recommended for decubitus.

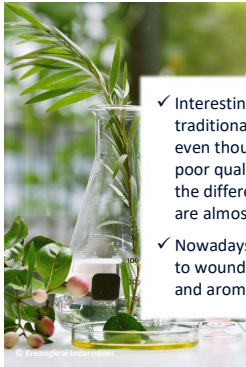
www.kicozo.info



From tradition to modern times

- ✓ These books mentioned herbs such as chamomile or calamus, or mixtures of spearmint, chamomile, lavender, rosemary and thyme, to be added to medicinal baths for skin diseases.
- ✓ For itching, the recommendation was taking a wheat bran or starch bath, of talcum powder or menthol powder, in addition to a carbolic (phenol) solution, or rubbing the area with lemon juice.
- ✓ They also recommend carbonated baths.

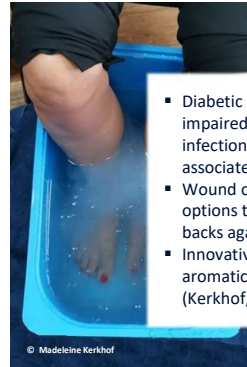
www.kicozo.info



From tradition to modern times

- ✓ Interestingly, in our advanced medical and nursing practice, traditional ointments such as zinc oxide are still widely used, even though the evidence of the benefits is often of very poor quality and outdated (O'Connor & Murphy, 2014), or the differences between zinc oxide ointment and a placebo are almost ignorable (Ågren et al., 2021).
- ✓ Nowadays there is growing interest in bringing plants back to wound care and wound dressings (Isopencu et al., 2023) and aromatics have shown excellent results (Kerkhof, 2025).

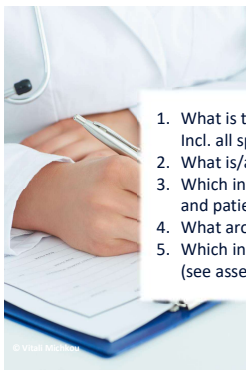
www.kicozo.info 



Diabetics and wounds

- Diabetic wounds pose a substantial clinical challenge due to impaired healing, and susceptibility to inflammation and infections, often resulting in lower limb amputation, with associated consequences (Burgess et al, 2021).
- Wound care providers may be reluctant to embrace other options than standard protocols, unless they are with their backs against the wall.
- Innovative protocols combining carbonated baths and aromatics significantly improve outcomes and quality of life (Kerkhof, 2023; Miya et al., 2025).

www.kicozo.info 



10 step treatment approach

1. What is the situation now?
Incl. all specifics: age, gender, history, lifestyle, etc. + photo
2. What is/are the goal(s) you wish to achieve?
3. Which interventions/treatments promote applicability and patient compliance the best?
4. What aromatics do you need to reach your goal(s)?*
5. Which individual circumstances need to be considered (see assessment)?

www.kicozo.info 



10 step treatment approach

Step 4: I'm looking for (evidence based) aromatics as:

- Wound healing agents
- Antimicrobials, as much fitting any culprit(s) as possible
- Analgesics
- Emollients
- Terrain support (treatment and prevention of recurrence)
- Circulation & lymphatic drainage promoting agents

All in a suitable base, fitting the terrain

www.kicozo.info 



10 step treatment approach

6. Preparing, under strict hygienic protocols
7. Treatment (by health care provider and/or patient)
8. Follow up / supportive care i.e. supporting microcirculation lymphatic drainage of the wider area, carbonated baths
9. Evaluation (verbal, visual, measure scales) and advice on any changes and / or continuation of the treatment
10. Reporting in patient file

www.kicozo.info 



Aloe vera

- Aloe vera (Aloe barbadensis) has been used for medicinal purposes in several cultures for millennia.
- The first reference to Aloe vera in English was a translation by John Goodyew in A.D. 1655 of Dioscorides' Materia Medica.
- In the mid-1930s it was successfully used to treat chronic and severe radiation dermatitis (Surjushe, Vasani & Saple, 2008).

www.kicozo.info 

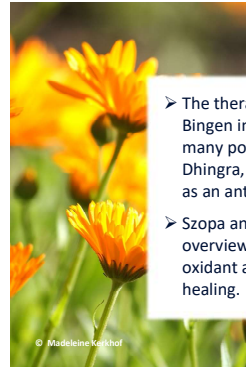


Aloe vera gel

- In a pharmacological update Sánchez et al. (2020) on randomized, double-blind, placebo-controlled studies confirm aloe vera's ability to accelerate and facilitate rapid tissue epithelialization and granulation and wound healing.
- Aloe vera gel has also shown itch relieving and analgesic properties in wound care (Mahboub et al., 2021). Recent clinical research showed its significant analgesic potency for pressure ulcer pains (Hosseini et al., 2024). It is also antibacterial (Fani & Kohanteb, 2012).

© Jakub Gajda

www.kicozo.info



Calendula (marigold)

- The therapeutic use of Calendula goes back to Hildegard von Bingen in the 12th Century and it has been mentioned in many popular medical books for almost 100 years. Dhingra, Dhakad & Tanwar (2022) describe its history of use as an anti-inflammatory, analgesic and anti-septic.
- Szopa and Klimek-Szczykutowicz (2020) offer an extensive overview of the studies on (more) properties, from anti-oxidant and neuroprotective, to antimicrobial and wound healing.

© Madeleine Kerkhof


www.kicozo.info



Calendula (marigold) CO₂-total

- Moses et al (2023) specifically mention the triterpene ester faradiol as a major constituent and very valuable for wound healing, decreasing bacterial load and pain in (diabetic) wounds, and significantly enhancing wound healing.
- Other studies confirm Calendula's healing powers as being highly anti-inflammatory (Preethi et al, 2009), and wound healing (Giostri et al, 2022), and granulation promoting (Givol et al, 2019).

© Madeleine Kerkhof

www.kicozo.info



Sea buckthorn

- Sea buckthorn (*Hippophae rhamnoides*) has been used for centuries as a medicinal and nutritional supplement across Asia and Europe (Mihal et al., 2023).
- Sea buckthorn is rich in palmitic acid, carotenoids, pigments and: palmitoleic acid, also called omega-7 fatty acid which increases telomerase activity and accelerates healing of grafted burn and donor site wounds (Niimi et al., 2022).

© Madeleine Kerkhof

www.kicozo.info

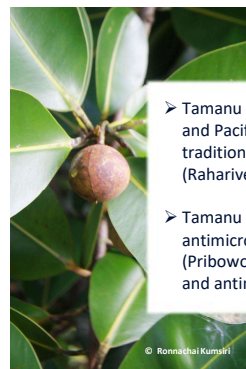


Sea buckthorn CO₂-total

- Sea buckthorn extracts are: Microcirculation promoting (Seven et al., 2009), powerful analgesics, emollient, anti-inflammatory (Rodhe et al., 2013), antimicrobial (Smida et al., 2019), supporting skin recovery after UV damage (Gegotek et al., 2018), skin protective (Khan et al., 2014), burn, wound and skin healing (Abdullahzadeh & Shafiee 2021).
- I use this extract in many wound care products.

© Madeleine Kerkhof

www.kicozo.info

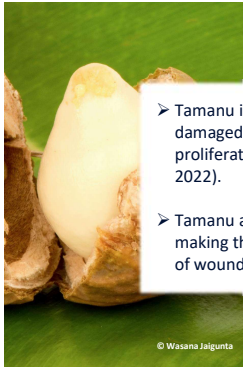


Tamanu oil

- Tamanu (*Calophyllum inophyllum*) is native to Africa, Asia and Pacific countries, from where its medicinal and cosmetic traditional uses for centuries have been reported (Raharivelomanana et al., 2018).
- Tamanu oil has potent anti-inflammatory, antioxidant, antimicrobial, analgesic, and wound healing abilities (Pribowo et al., 2021; Ngyen et al., 2017), is anti-infectious and antimicrobial (Léguillier et al., 2015).

© Romnashai Kumsiri

www.kicozo.info

Tamanu oil

- Tamanu is highly valuable for the extremely sensitive and damaged skin, promoting wound healing by enhancing the proliferation and migration of epidermal cells (Saki et al., 2022).
- Tamanu also has analgesic and itch relieving properties, making this oil excellent for both healing and symptom relief of wounds.

© Wasana Jalunta

www.kicozo.info 

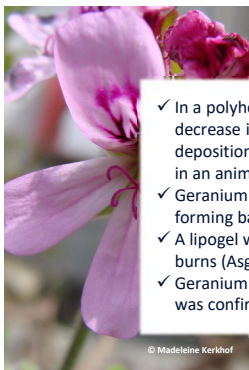


Geranium

- ✓ Originating in South Africa, the Pelargonium graveolens plant was supposedly initially used by ancient Egyptians for its aromatic properties and therapeutic benefits.
- ✓ It was often used in skincare preparations, perfumes, and even as an insect repellent.
- ✓ When the Geranium plant was introduced to Europe in the late 17th century, its fresh leaves were used in finger bowls.

© Madeleine Kerkhof

www.kicozo.info 



Geranium EO

- ✓ In a polyherbal formulation Mahboubi et al (2016) saw a decrease in bacterial load (*S. aureus*), increased collagen deposition improved wound healing, and wound contraction in an animal model of wound infection.
- ✓ Geranium is an excellent antimicrobial against biofilm forming bacteria and fungi (Kačániová et al., 2023).
- ✓ A lipogel with geranium showed excellent wound healing for burns (Asgarirad et al., 2023).
- ✓ Geranium is also an excellent analgesic which, interestingly was confirmed by a study on inhalation (Seo et al., 2023).

© Madeleine Kerkhof

www.kicozo.info 



Helichrysum

- ✓ The Helichrysum genus appears in the "Historia Plantarum" (3rd–2nd century B.C.) by the Greek Theophrastus of Eresos. He reports that it may be used in the treatment of burns (mixed with honey) and stings/bites of venomous animals.
- ✓ Its medicinal properties are reported in his "Materia Medica" (1st century A.D.), by Dioscorides, as useful for snake bites, sciatica and hernia's.
- ✓ The Dutch Herman Boerhaave reported treatment of nervous disorders (Antunes Viegas et al., 2014)

© Madeleine Kerkhof

www.kicozo.info 



Helichrysum

- ✓ Recent study showed the wound healing properties in diabetic wound repair Andjic et al., 2024), and that the hydrolat promotes tissue regeneration in wound healing (Serra et al., 2023).
- ✓ Helichrysum is also an excellent anti-inflammatory in skin conditions. Diluted at 10% in *Rosa rubiginosa* (rosehip) oil it reduced local inflammation, oedema, bruises, and hematomas in post-operative scars (Furlan & Bren, 2023).

© Madeleine Kerkhof

www.kicozo.info 



Lavandin x 'grosso' EO

- ✓ Lavandin is a clone between Lavender (*Lavandula angustifolia*) and Spike Lavender (*Lavandula spica*). In the 1970s, a farmer by the name of Pierre Grosso created the Lavandin cultivar 'Grosso'.
- ✓ Lavandin x intermedia "grosso" is a great analgesic, possibly to be contributed to its linalool, linalyl acetate, 1,8-cineole and camphor contents. But there is more.
- ✓ This lavandin type has also shown antibacterial properties against gram+ and gram- bacteria (Garzoli et al., 2019).

© Madeleine Kerkhof

www.kicozo.info 



Lavandin x 'grosso' EO

- ✓ A recent review confirms these findings and also its actions as analgesic and anti-inflammatory (Pokajewicz et al., 2023).
- ✓ Lavandin may show local antithrombotic activity without interfering with systemically administered blood thinners (Ballabeni et al., 2004). This could explain why the oil can be helpful in the reabsorption of tiny blood clots in wounds and haematomas.

www.kicozo.info 



Lavender (True)

- ✓ Lavender was known and used since ancient times, as mentioned by Theophrastus, Dioscorides and Pliny the Elder.
- ✓ The Roman physician, surgeon and philosopher Galen (129-199 AD) listed lavender among the antidotes used against poisoning and insect bites.
- ✓ Later on, Hildegard von Bingen (1098-1179) devoted a chapter on lavender in her "Materia Medica", distinguishing between *Lavandula vera* and *Lavandula spica*.
- ✓ The first Lavender oil was obtained in the 16th century (Pohrib & Nistor, 2012).

www.kicozo.info 



Lavender (True) EO

- ✓ Lavender's wound healing properties are supported by fairly recent reviews: a faster rate of wound healing, increased expression of collagen, and enhanced activity of proteins involved in the tissue remodeling process in wounds (Nascimento et al., 2022; Samuelson et al., 2020).
- ✓ Topically applied lavender oil is anti-inflammatory (Rai et al., 2020) a potent analgesic action (Ghods et al., 2015; Karaman et al., 2016; Lejeune et al., 2023), even in neuropathic (and postherpetic) pains (Rivaz et al., 2021; You et al., 2024).

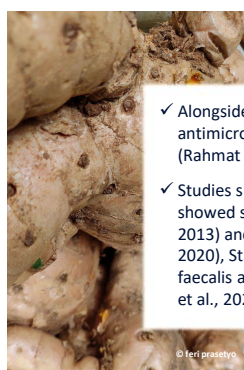
www.kicozo.info 



Temulawak

- ✓ *Curcuma xanthorrhiza* or temulawak has been extensively utilized in Indonesia as medicinal and nutritional plants since immemorial time.
- ✓ Its rhizome is important in jamu formulation (Indonesian traditional medicine).
- ✓ Temulawak is traditionally used to treat several ailments from lack of appetite and liver illness to, hemorrhoids, rheumatism and skin eruptions (Rhamat, Lee & Kang, 2021).
- ✓ It's CO2-select extract is one of my favorite aromatic "new kids on the block".

www.kicozo.info 



Temulawak CO2-select

- ✓ Alongside other actions, temulawak has shown antioxidant, antimicrobial, anti-inflammatory, and skin care properties (Rahmat et al., 2021).
- ✓ Studies showed that its major constituent xanthorrhizol, showed significant inhibition of *Candida* (Rukayadi & Hwang, 2013) and bacteria including *Escherichia coli* (Yogiara et al., 2020), *Streptococcus mutans*, *S. sanguinis*, *Enterococcus faecalis* and *Bacillus cereus* with no reported toxicity (khalid et al., 2021).

www.kicozo.info 



Manuka EO

- ✓ The manuka tree (*Leptospermum scoparium*) is native to New Zealand. It was long perceived as a weed in the 1900s.
- ✓ The leaves and bark however were used for a variety of medicinal purposes: leaf decoctions for reducing fever and to treat colds, and bark preparations as sedatives.
- ✓ Nowadays the tree is highly valued for its flowers, of which bees make the invaluable manuka honey, and for its essential oil (Derraik, 2008)

www.kicozo.info 



Manuka EO

- ✓ The skin friendly oil is highly antibacterial against staphylococci, streptococci, and antibiotic and multidrug resistant *Pseudomonas aeruginosa* in (chronic) wound infections, sometimes more efficient than tea tree oil (*Melaleuca alternifolia*) or lavender (*Lavandula angustifolia*).
- ✓ Manuka oil also shows excellent antifungal and antiviral (especially Herpes Simplex viruses, including acyclovir resistant ones) properties (Mathew et al., 2020).

www.kicozo.info 



Wounds in diabetics, cases

Jessica, 70 something, Diabetes type 2
 Wound (Ulcus cruris) on the left lower leg
 Does not respond to weeks of standard treatment
 New treatment: carbonated baths & aromatic wound care gel
 Excellent result in only a few days. Happy Jessica and carers.
The gel contains: aloe vera gel, sea buckthorn seed CO2-to, calendula CO2-to, tamanu, temulawak CO2-se, geranium EO, helichrysum EO, lavandin grosso EO, lavender EO, manuka EO.

www.kicozo.info 



Wounds in diabetics, cases

Annemarie, 50 something, Diabetes type 1
 The wound is deep and painful and in risk of delayed healing
 Treatment: carbonated baths & aromatic wound care gel
 The treatment is very successful. Only a scar remains, yet in warm days lymphatic drainage is still needed.
The gel contains: aloe vera gel, sea buckthorn seed CO2-to, calendula CO2-to, tamanu, temulawak CO2-se, geranium EO, helichrysum EO, lavandin grosso EO, lavender EO, manuka EO

www.kicozo.info 



Conclusion:
 evidence based pure and natural plant extracts and supportive treatments, such as carbonated baths, are the future of integrative wound healing and can be implemented alongside standard care and wound dressing

Thank you!

Flower Powers
 from Tradition to Modern Wound care
 from Science to Practice

Madeleine Kerkhof
 Kicozo.info