

## Overview on Formulation consideration of herbal ointment for rheumatoid arthritis

Pravinkumar Kamble<sup>1</sup>, Satish Kankarne<sup>2</sup>, Akshay Katrajkar<sup>3</sup>, Suraj Kedar<sup>4</sup>,  
Prof. Ankita Bankhele<sup>5</sup>, Dr. Rajesh Oswal<sup>6</sup>

Research Scholar<sup>1,2,3,4</sup> B.Pharmacy final year, Assistant Professor Department of Pharmaceutics<sup>5</sup>, Principal<sup>6</sup>  
GenbaSopnanrao Moze College of Pharmacy Wagholi, Pune. 412207 Maharashtra.

Submitted: 01-06-2022

Revised: 14-06-2022

Accepted: 16-06-2022

**ABSTRACT:-** Rheumatoid arthritis (RA) is **auto immune mediated inflammatory disease(IMID)**[1]. Rheumatoid arthritis occurs when our immune system attacks the tissues near joints, this is due to release of certain chemicals and enzymes that begin to eat away the cartilage and bones [2]. It affects all the joints in the body, some forms of arthritis can also affect the body's internal organs [3]. The symptoms of RA include inflammation, pain, swelling and stiffness of the joints, it can also lead to deformity and disability of the joint in severe cases [4]. There are several causes for RA from which some are unknown but some include genetic factor, family history, age, environmental factors, hormones, smoking etc. [5]. Overall formulations available and rewrite about important advantage of ointment over other formulation. There are many medicinal plants that have shown anti-rheumatoid arthritis properties. These plants are Turmeric, Neem, Tulsi, Ginger, Haldi, Pudina, Ashagwanda, Harra, Sadabahaer, Amla, Lahsun, This article provides an overview of the medicinal plants with phytoconstituents which can be used in the treatment of RA and different treatments available for Rheumatoid arthritis[6]. pharmacological studies can be carried out and the plants can be further explored for future studies[7]. Even modern drugs used for the better improvement of the symptoms, offer only temporary relief and produce severe side effects, so researchers rely on natural remedies, for treatment of various diseases, with efficacy and safety, and with fewer side effects[8].

**Keywords :-** Rheumatoid Arthritis, Inflammation, Joints, Disorder and Treatment.

### I. INTRODUCTION OF RHEUMATOID ARTHRITIS:-

Rheumatoid arthritis is an autoimmune inflammatory disorder affecting almost 1-3% of the world population.[1] First case of RA was found in

France. The word Arthritis means inflammation of the joint ("artho" means the joint and its meaning is inflammation of the joint).[2] RA occurs when our immune system attacks the tissues near joints, this is due to release of certain chemical and enzymes that begin to eat away the cartilage and bones. [3] Arthritis also affects small joints of the hands and feet, wrists, elbows, shoulders, knees and ankles. There are several factors which may contribute to development of RA. [4] Some people who develop RA have family history, largest genetic risk factor described for RA, estimated to contribute approximately 30% of the genetic risk for the disease.[5] RA affects women more often than men<sup>41</sup>. [6] Hormonal changes are also related to be an increased risk of RA<sup>42</sup>[7]. The risk increases with age and it commonly develops between ages 40 to 60<sup>43</sup> [8]. However, it's important to remember that it is not an infectious disease, it is not contagious but it is autoimmune disorder [9]. There are many environmental factors contributing to RA, but smoking is most convincingly related to RA [10].

The symptoms are Warm, swollen joints Symmetrical pattern of affected joints Fatigue, occasional fevers, loss of energy. Joint inflammation often affecting the wrist and finger joints. Joint inflammation sometime affecting the joints in the neck, shoulders, elbows, hips, knees and ankles<sup>43</sup>.

Home remedies for RA is yoga, exercise regularly, relaxation.

There are so many medicinal plants that have shown anti-rheumatoid arthritis properties.[11] These plants are Turmeric, Neem, Tulsi, Ginger, Haldi, Pudina, Ashagwanda, Harra, Sadabahaer, Amla, Lahsun<sup>44</sup>

### Mechanism of action of Rheumatoid arthritis :-

During inflammation in a joint, patients experience hyperalgesia and sometimes resting

pain. Hyperalgesia includes stronger pain upon noxious stimulation (e.g. strong pressure or twisting the joint) and the experience of pain when stimuli are applied that are not felt painful under normal conditions (palpation, movements in the working range). Resting pain is felt without intentional stimulation. Neuronal mechanisms involved in arthritic pain are the peripheral sensitization (sensitization of primary afferent fibres supplying the joint) and central sensitization (sensitization of spinal cord neurons). The peripheral sensitization includes the sensitization of so-called polymodal nociceptors (high threshold receptors that are excited under normal conditions by noxious mechanical stimuli) and of silent nociceptors (neurons that are not excited even by noxious mechanical stimuli). When these nociceptors are sensitized in the process of inflammation they are rendered more excitable and then they even respond to normally non-painful stimuli. In addition, the enhanced input from sensitized nociceptors induces hyperexcitability of second-order neurons in the spinal cord. This central sensitization is an increased gain in the spinal nociceptive processing, and sensitized spinal cord neurons show stronger responses to stimulation of inflamed tissue but also to stimulation of adjacent and even remote healthy tissue. Thus the whole pain pathway is sensitized and this explains why, in the inflamed tissue, pain is evoked by stimuli that do not elicit pain under normal conditions<sup>17</sup>. Numerous mediators and ion channels are involved in the activation and sensitization of nociceptive neurons<sup>17</sup>. Importantly, some mediators that are involved in the pathophysiology of inflammation are also involved in the generation of peripheral and central sensitization (e.g. prostaglandins). Cyclooxygenases and prostaglandins in the

periphery and in the spinal cord have been important topics in pain research. During development of an acute inflammation in the knee joint, prostaglandin E<sub>2</sub> release in the spinal cord is significantly enhanced. This is in part due to an upregulation of cyclooxygenase-2 in the spinal cord that is already seen within 3 hours of inflammation<sup>18</sup>. The application of prostaglandin E<sub>2</sub> to the spinal cord produces hyperexcitability of spinal cord neurons similar to peripheral inflammation. When indomethacin is applied to the spinal cord before and during the development of joint inflammation, the development of central sensitization is significantly attenuated [4]. These findings show the importance of spinal prostaglandins in the generation of inflammation-evoked spinal hyperexcitability. However, the spinal administration of indomethacin to the spinal cord after establishment of inflammation did not reduce responses of spinal cord neurons to mechanical stimulation of the inflamed joint, raising the question of how important spinal prostaglandins are in the maintenance of spinal hyperexcitability [4]. Prostaglandin E<sub>2</sub> acts through EP<sub>1</sub>, EP<sub>2</sub>, EP<sub>3</sub> and EP<sub>4</sub> receptors. The generation of spinal hyperexcitability by spinal prostaglandin E<sub>2</sub> can be mimicked by spinal application of agonists at the EP<sub>1</sub>, EP<sub>2</sub> and EP<sub>4</sub> receptors. When the joint is inflamed and hyperexcitability is established, EP<sub>2</sub> and EP<sub>4</sub> receptor agonists fail to change responses of spinal cord neurons to mechanical stimulation of the joint. Interestingly, however, the spinal application of an agonist at the EP<sub>3</sub> alpha receptor even reduced responses although it had no effect under normal conditions [5]. Thus considerable plasticity of EP receptor activation seems to determine the precise role of spinal prostaglandins in different phases of inflammation.



### Auranofin

Formula: C<sub>20</sub>H<sub>34</sub>AuO<sub>9</sub>PS

Bioavailability: 40%

Auranofin is a gold salt classified by the World Health Organization as an antirheumatic agent. It has the brand name Ridaura.

Auranofin is used, with rest and nondrug therapy, to treat rheumatoid arthritis. It improves arthritis symptoms including painful or tender and swollen joints and morning stiffness.

Auranofin is used to treat rheumatoid arthritis. It improves arthritis symptoms including painful or tender and swollen joints and morning stiffness. Auranofin is a safer treatment compared to the more common injectable gold thiolates (gold sodium thiomalate and gold thioglucose), but meta-analysis of 66 clinical trials concluded that it is somewhat less effective.

The drug was approved for the treatment of rheumatoid arthritis in 1985. No longer a first-line treatment for rheumatoid arthritis, due to its adverse effects, "most of which are associated with long-term use for chronic disease. The most common adverse effects are gastrointestinal complaints such as loose stools, abdominal cramping and watery diarrhea, which can develop in the early months of treatment. The development of loose stools occurs in 40 % of patients, while watery diarrhea is reported in just 2–5 % of patients, and in most cases these symptoms were alleviated by reducing or splitting the dose.

#### Aloe Vera<sup>20</sup> :-

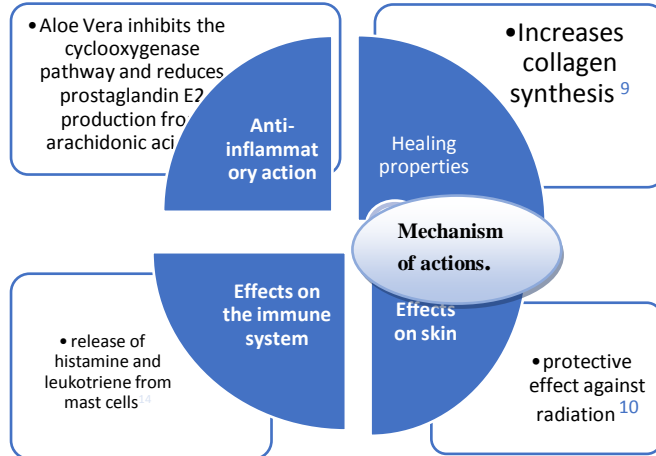
**Active components with its properties:** Aloe Vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids.

1. **Vitamins:** It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline. Antioxidant neutralizes free radicals.
2. **Enzymes:** It contains 8 enzymes: alkaline phosphatase, amylase, Brady kinase, carboxypeptidase, catalase, cellulose, lipase, and peroxidase. Brady kinase helps to reduce excessive inflammation when applied to the skin topically, while others help in the breakdown of sugars and fats.
3. **Minerals:** It provides calcium, chromium, copper, selenium, magnesium, manganese,

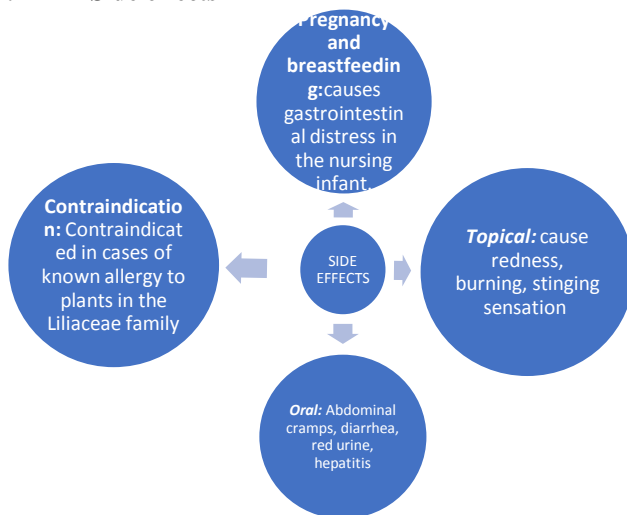
potassium, sodium and zinc. They are essential for the proper functioning of various enzyme systems in different metabolic pathways and few are antioxidants.

4. **Sugars:** It provides monosaccharide's (glucose and fructose) and polysaccharides: (glucomannans/polymannose). These are derived from the mucilage layer of the plant and are known as mucopolysaccharides. The most prominent monosaccharide is mannose-6-phosphate, and the most common polysaccharides are called glucomannans [beta-(1,4)-acetylated mannan]. Acemannan, a prominent glucomannan has also been found. Recently, a glycoprotein with anti-allergic properties, called alprogen and novel anti-inflammatory compound, C-glucosyl chromone, has been isolated from Aloe vera gel.
5. **Anthraquinones:** It provides 12 anthraquinones, which are phenolic compounds traditionally known as laxatives. Aloin and emodin act as analgesics, antibacterials and antivirals.
6. **Fattyacids:** It provides 4 plant steroids; cholesterol, campesterol,  $\beta$ -sisosterol and lupeol. All these have anti-inflammatory action and lupeol also possesses antiseptic and analgesic properties.
7. **Hormones:** Auxins and gibberellins that help in wound healing and have anti-inflammatory action.
8. **Others:** It provides 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. It also contains salicylic acid that possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances penetrative effect of the other ingredients into the skin. Saponins that are the soapy substances form about 3% of the gel and have cleansing and antiseptic properties.

▪ **Mechanism of actions**



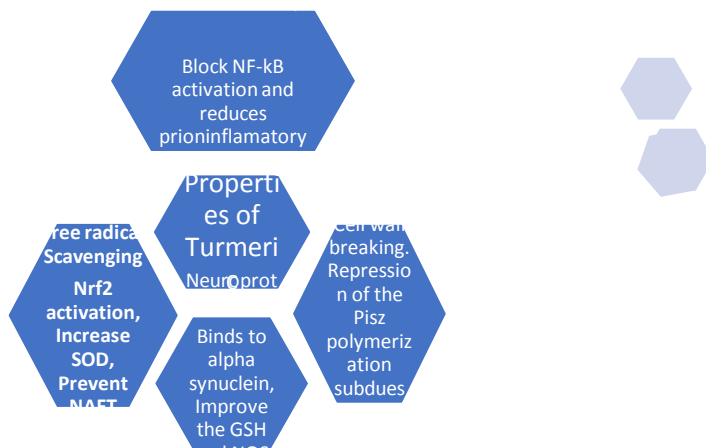
1. **Side effects**<sup>15,16</sup>



Uses<sup>19</sup>:-

1. Reduces Arthritic Swelling = Application of aloe can reduce pain and swelling of arthritis, and drinking aloe juice also help to inhibit the autoimmune reaction associated with certain form of arthritis.
2. Eases Intestinal problem = Aloe vera juice can be very effective for treating most digestive conditions. The juice help to neutralize stomach acidity and relieve constipation and gastric ulcers.
3. Smooth Burns and Heals Wounds = it's sunburn, burns, cuts and scraps aloe is the best. Application to wounds, aloe gel is a mild anesthetic, relieving itching, swelling and pain; it is also antibacterial and antifungal.
4. rday can heal stubborn infection
5. Eye irritations and injuries = Apply a freshly cut slice of aloe over the closed eye. Then open the eyelid to coat it with aloe.
6. Increase weight loss
7. Help prevent cancer.
8. Give relief from side effect of radiotherapy.

2) **Turmeric :-**



Functional foods have been used traditionally for medicinal purposes through history. In recent decades, there is an increasing interest in research on functional foods and dietary supplements for different diseases. Turmeric is one of the most popularly investigated functional foods. Turmeric (*Curcuma longa* L.; syn.: *Curcuma domestica* Valetton) belongs to the Zingiberaceae family and is extensively cultured in the tropical areas of Asia. Alternative names frequently used for turmeric are turmeric root and yellow root. It generally attains a height of 3–5 feet and has oblong leaves with yellowish funnel-shaped flowers. *C. longa* can be grown in diverse environmental situations at a temperature of 20–35°C with yearly rain of 1500 mm. It grows in well-drained sandy or clay loam soils, having a pH of 4.5–7.5 with good organic status, where it flourishes outstandingly<sup>20</sup>.

Uses<sup>20</sup> :-

1. Hay fever. Taking turmeric by mouth seems to reduce hay fever symptoms such as sneezing, itching, runny nose, and congestion.
2. Depression. Most research shows that taking curcumin, a chemical found in turmeric, by mouth reduce depression symptoms in people already using an antidepressant.
3. Swelling (inflammation) and sore inside the mouth (oral mucositis). Taking curcumin, a chemical found in turmeric, by mouth, or as a lozenge or mouth wash, seems to prevent swelling and sores in mouth during radiation treatment for cancer.
4. Stomach ulcer. Taking turmeric by mouth does not seem to improve stomach ulcers.

5. Osteoarthritis. Taking turmeric extracts, alone or together with other herbal ingredients, can reduce pain and improve function in people with knee osteoarthritis. People commonly use
6. Turmeric is used as an anti-inflammatory treatment for skin conditions. It is also used to treat pain in the body, eye infection.
7. Turmeric is effective treatment of indigestion. damage from free radicals in the body fighting potential
8. Turmeric is also provides an antioxidant benefit, fighting potential damage from free radicals in the body.
9. Turmeric has a warm, bitter, taste, and is frequently used to flavor or color curry powders, mustards, butters, and cheese.
10. Curcumin and other chemical in turmeric might decrease swelling.
11. It is often used to treat conditions that involve pain and inflammation

- IUPAC NAME :- (1E,6E)-1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione[31]
- CHEMICAL FORMULA :- C<sub>21</sub>H<sub>20</sub>O<sub>6</sub>

3) **Neem :-**

*Azadirachta indica* is a fast growing evergreen population tree found commonly in India, it has been used in ayurvedic medicine for more than 4000 years due to its medicinal properties. Neem is called 'arista' in Sanskrit a word that means 'perfect, complete and imperishable'. The number of benefits of neem is listed in ancient document like 'Charak-Samhita'. It is commonly called 'Indian Lilic', belongs to the family Meliaceae<sup>21</sup>

Biologically active principle isolated from different parts of the plant include: azadirachtin, meliacin, gedunin, salanin, nimbin, valassin and many other derivative of these principle Meliacin forms the bitter principles of neem seed oil, the seed also contain tignic acid (5-methyl-2-butanic acid) responsible for the distinctive odour of the oil. These compound belong to natural product called triterpenoids. The active principle are slightly hydrophilic, but freely lipophilic and highly soluble in organic solvent like hydrophilic, alcohol, ketones and ester<sup>21</sup>.

#### USES:-

1. Insect Repellent :- Early research suggests that applying extract of neem root or leaf to the skin help repels black flies.
2. ULCER =some research suggests that taking 30-60 mg of neem bark extract twice daily by mouth for 10 weeks help heal stomach and intestine ulcers.
3. Dental plaque :- Early research suggests that applying neem leaf extract gel to the teeth and gum twice daily for 6 weeks might reduce plaque formation. it also might reduce the number of bacteria in the mouth that can cause plaque.
4. 11Neem oil contains fatty acid, antioxidants, and antimicrobial compounds, and can be benefit the skin in a range of ways. These compound may help fight skin infections, promote wound healing and combat signs of skin aging.
5. Psoriasis = Early research suggests that taking neem extract by mouth for 12 weeks, along with daily sun exposure and the application of a coal tar and salicylic acid cream, reduces the severe psoriasis.

#### SYMPTOMS IN PEOPLE.



#### 2) **Neem and Turmeric Anti -Acne Lotion =**

This lotion and perfect for daily ritual of oily and acne-prone skin. Turmeric is well known in Ayurveda for its skin calming properties. Neem is

1. Head lice
2. Fever
3. Upset stomach
4. Breathing condition
5. Malaria
6. Skin condition

#### ❖ **DIFFERENT FORMULATION IN MARKET :-**

##### 1) **Mamaearth Aloe Turmeric Gel =**

It is a multi-purpose skin product. In this gel helps against common skin problem and improve the skin. Use of this gel is skin care, hair care. Benefits of this gel is it calms and soothes sun-damaged skin, scalp, irritation, and burns. The antioxidant and antibacterial power of turmeric fight acne and pimple problem<sup>23</sup>.

#### Ingredient:-

- 1] Aqua
- 2] Aloe vera Extract
- 3] Glycerin
- 4] Sodium PCA
- 5] Turmeric Extract
- 6] Allantoin
- 7] Xanthan Gum
- 8] Vitamin E
- 9] Sodium Benzoate
- 10] IFRA Certified Allergen Free Fragrance

#### Direction for use:-

- Good for all skin and hair type; suitable for people above 15 years of age.
- Prepare a face and hair mist by mixing the gel with water.
- For skin –take an adequate amount of gel and applying it on sunburnt, shaved, tanned skin.

very beneficial for imbalanced skin prone to acne, pimples<sup>23</sup>.

#### Ingredient :-

- 1] Fresh neem leaves



- 2] Whole Turmeric
- 3] Beeswax
- 4] Aqua
- 5] Organic Blackseed oil
- 6] Organic Jojoba oil
- 7] Organic sunflower oil
- 8] Organic sesame oil
- 9] Vitamin E
- 10] Natural Essential oil

Benefit =

- Treats acne –prone skin.
- Unburdens excess oil .
- Clarifies scars and pimples.
- Reveals fresh and radiant skin.
- Best for Acne and unclear skin.



3) **Betamethasone Valerate** =This medication is used to treat a variety of skin condition (e.g. eczema , dermatitis, allergies, rash).it is a reduce the swelling ,itching, and

redness that can occur in these type of condition .This medication is a medium –strength corticosteroid<sup>24</sup>



4) **Ciprofloxacin Hcl** =Ciprofloxacin ophthalmic ointment is used to treat conjunctivitis. ciprofloxacin is in a class of antibiotic called fluoroquinolones. it work by killing the bacteria that cause infection<sup>25</sup>.



• **Plants used for preparation of herbal cream<sup>26</sup>.**

Sr.no.	Common name ,Biological source & Family	Part used	Uses
1)	Aloe vera, Aloe barbadensis, Liliaceae	Leaf (powder)	Moisturizer,cleansing,soothing, antiwinkles,anti-inflammatory,Enzyme action
2)	Neem, Azadirachta indica, Meliaceae	Leaf [extract]	Antiseptic, Astrigent ,Moisturizer,
3]	Turmeric, Curcuma longa, Zingiberaceae	Rhizomes [powder]	Colouriningagent,antiseptic, antimicrobial.

**OINTMENT -**

Certain European and oriental countries have been exploring the use of herbs and has been in practice since the centuries. Great work has been done which eluded the common man's reach and knowledge. With the techno-savvy lifestyle in 21st century human sufferings are coming out with different names<sup>27</sup>. The basic herbs have the answer

with no side effects and effective remedies and the golden fact is use of herbal treatment is independent of any age group. When two or more herbs are used in the formulation they are known as polyherbal formulations. Numerous studies have been conducted with the extract of Aloe Vera (Asparagaceae, Family- Xanthorrhoeaceae), Need leaves (Azadirachta indica Family-Meliaceae) and



Turmeric rhizomes (*Curcuma longa* Family-Zingiberaceae) With the combination of many other herbal drugs<sup>28</sup>.

Along with other dosage forms herbal drugs are also available in the form of ointment which is semisolid preparation used topically for several purposes e.g. as protectants, antiseptics, emollients, antipruritic, keratolytics and astringents<sup>28</sup>.

Neem is consists of leaves and other aerial parts of *Azadirachta indica* Family-Meliaceae. Neem leaves and neem oil has many properties like antiseptics, insecticides also attributed antifertility and antiviral properties and is being screened for efficacy in treatment of AIDS<sup>28</sup>.

Turmeric consists of dried as well as fresh rhizomes of plant known as *Curcuma longa*. Family: Zingiberaceae. It is used as antiseptic, expectorant, condiment or spice. It is rich in antioxidants, research conducted has demonstrate uses of turmeric in the treatment of arthritis, liver diseases, Alzheimer and depression management<sup>29</sup>

Ointment are are a class of semi-solid dosage form meant for external application to the skin or mucous membrane. Ointment contain medicament, suspended, emulsify or dissolved in a base. They perform emollient and protective action an ointment can also be as a shooting, healing, slightly oily or fatty substance into which essence of healing, slightly oily or fatty substance into which the essence of a healing plant has been dissolved basically, this is accomplished by heating the fat or oil with the plant until it loses its normal colour and oil or fat has absorbed the healing chemical principle. An ointment are homogeneous, viscous semisolid preparation, most commonly a greasy, oily<sup>29</sup>

Oil 80%, Water-20%) with high viscosity that is intended for external application to skin or mucous membranes. They are used as emollients or for the application of active ingredients to the skin for protective, therapeutic, or prophylactic purposes and where a degree oocclusion is desired. Ointments are used topically on a variety of body surfaces. These include the skin and the mucous membrane of the eye (an eye ointment), chest, vulva, anus and nose. Ointment have very moisturizing characteristic and are effective for dry

skin. They have very low risk of sensitization due to having few ingredients beyond the base oil or fat and also low irritation risk. They have more greasiness so mostly disliked by patients.

▪ **Type Of Ointment =**

The various type of ointments are:

- 1 .Unmedicated ointments
2. Medicated ointment

**1.UNMEDICATED OINTMENTS<sup>31</sup>**-For the application of API to skin for protective, therapeutic or prophylactic purpose.These ointments do not contain any drugs. They are useful as emollients, protectants

Example: Petroleum jelly

**2. MEDICATED OINTMENTS** -These ointments do not contain any drugs. They are useful as amollients , protectants. These are used for physical effect.

These are of several sub-type :

- 1] Dermatologic ointments
- 2] Ophthalmic ointments
- 3] Rectal ointments
- 4] Vaginal Ointments
- 5] Nasal Ointments

**Characteristics of ointments<sup>31</sup>=**

- 1). Ointments are used topically for several purposes , e.g. as protectants,antiseptics, emollients , antipruric and astrigents.
- 2).In the case of a protective ointment, it serves to protect the skin against moisture, air, sun rays and other external factors.
- 3).It is necessary that the ointment her penetrates the human skin barriers nor facilitates the absorption of substances through this barrier.
- 4).An antiseptic ointment is used to destroy or inhibit the growth of bacteria.Frequently bacterial infection aredeepy seated ;a base which has the capacity to either penetrate or dissolve and release the medication effectively is therefore desired.
- 5).Ointments used for their emollient effect should be easy to apply, be non-greasy and effectively penetrate the skin.

**Advantages and disadvantages of ointment<sup>34</sup>:**

Advantages	Disadvantages
1. They avoid first pass metabolism of drug.	1. These oily semisolid preparations are staining and cosmetically less aesthetic.

2. Convenient for unconscious patients having difficulty in oral administration.	2. Application with finger tips may contaminate the formulation or cause irritation when applied.
3. Comparatively they are chemically more stable and easy to handle than liquid dosage.	3. As compared to solid dosage forms, semisolid preparation are more bulky to handle.
4. They are suitable dosage forms for bitter taste drugs.	4. Though semisolid allow more flexibility in dose, dose accuracy is determined by uniformity in the quantity to be applied.

### ointment bases<sup>32</sup>

The vehicle or carrier of an ointment is known as ointment base. The choice of ointment base depends upon the nature of medicament, stability of ointment and clinical indication of the ointment

Bases can be conveniently categorized into the following type;

#### 1] Hydrocarbon Base -

• Characteristics :- Insoluble in water, Not water-washable Anhydrous, will not absorb water emollient, Greasy, soft paraffin ;hard paraffin ;liquid paraffin.

• These bases have following properties:-

- a) Small amount of aqueous component can be incorporated into these bases.
- b) These bases have emollient effect.
- c) These bases are difficult to wash off as these are w/o type of bases.
- d) These base do not dry out.
- e) These base keep the medicament in prolonged contact with skin.
- f) These bases act as occlusive dressing.

Examples: white petrolatum, yellow ointment, white ointment.

• Advantages-

- Inexpensive
- Nonirritative

-Nonirritating

-Good emollient, protective and occlusive properties

• Disadvantage –

-These bases have poor patient acceptance because of their greasy nature.

-They are not removed easily with washing when this is desired.

-They cannot absorb water and can absorb only limited amounts of alcoholic solution, so most liquid ingredients are difficult to incorporate into hydrocarbon base.

#### 2] Absorption base :-

These bases categorize into two groups:

A) Permit the incorporation of aqueous solution with the formation of water in oil type of bases. Example: Hydrophilic petrolatum Lanolin

B) These are already w/o type of bases and permit the additional amount of aqueous solution.

Example: Anhydrous lanolin

a) Useful as emollients

b) Difficult to remove from skin

• Absorption base have two subtype :

1] Anhydrous absorption base: These are hydrocarbon base that contain an emulsifier or emulsifiers that form water –in-oil emulsions when water or an aqueous solution is added.

Sr.no.	Parameter	Description
1	Composition	Oleaginous compounds Oleaginous bases + w/o surfactant Oleaginous base + water (>45% w/w)+o/w surfactant (HLB≥9) Polyethylene glycol

2	<b>Water content</b>	Anhydrous Anhydrous hydrous hydrous Anhydrous, hydrophilic <b>Affinity for water</b> Hydrophobic Hydrophilic Hydrophilic
3.	<b>Spread-ability</b>	Difficult Difficult Easy Moderate to easy
4.	<b>Washability</b>	Non washable Non washable washable washable
5.	<b>Stability</b>	Oils poor, hydrocarbon better Oils poor, hydrocarbon better Unstable especially alkali soap and natural colloids, nonionics better Stable
	<b>Uses</b>	Protectant, emollients, vehicle for hydrolyzable drug, emollients, vehicle for aqueous solution, solid and

Characteristics:- Insoluble in water ,Not water-washable Anhydrous ,will absorb water emollient, Greasy.

2] Water-in-oil emulsions: These are absorption base that contain water, the amount depending on the base. As semisolid emulsion, they are classified as cream under the proposed nomenclature scheme. Wool fat (anhydrous lanolin); hydrous wool fat; wood alcohol; beeswax.

**Advantage:**

-Absorption base have moderately good protective, occlusive, and emollient properties.

-They do not wash off easily so they hold incorporated medication in contact with the skin.

-They can absorb liquids,

a] Anhydrous absorption base can absorb significant amount of water and moderate amount of alcoholic solution. this is illustrated with sample prescription

b] Because they already contain water, emulsion, absorption base absorb variable amount of water and /alcohol.

**Disadvantage :**

1) some base in this group have poor patient acceptance.

(a) The anhydrous absorption base has a greasy nature similar to that of hydrocarbon base.

(b) Some lanolin –type base are somewhat sticky and have a mildly unpleasant odour.

2) They are not easily removed with washing.

3) Those base containing wool wax or wool –wax alcohol may be sensitizing, effect have been made to remove offending principle, including detergent and nature free fatty alcohol, which is reported to reduce the incident of hypersensitivity to almost zero.

4) Those base with soap –type emulsifiers (eg. Cold cream, Rose water) can have the compatibility problem associated with this type of emulsifying agent. This is discussed in the section on soft soap .

5) Those that contain water may have chemical stability problem with ingredients that are sensitive to hydrolysis.

6) Those containing water are also subject to microbial growth, and the usp require that these contain a preservative.

3] Water- removable base/Neutral oil bases:

Almond oil; coconut oil; olive oil; vitamin E. These bases are also called as emulsifying bases or oil in water type of emulsion bases. These are water washable bases. Mostly these bases are preferred for cosmetic purpose.

**Advantages of these base are:**

a) Some medicament are more effective in these bases.

b) These bases may be diluted with water.

Example: Hydrophilic ointment, Vanishing cream

**Properties of ointment base components oleaginous base absorption bases water removable bases (Emulsion bases)<sup>33</sup> Water bases**

**METHOD OF PREPARATION OF HERBAL OINTMENT<sup>36</sup>**

**1] Preparation of Neem extract**

Leaves of the plant were collected and washed thoroughly with distilled water and shade dried for 10 days. Dried leaves were ground into powder form. 100gm powder was imbibed with 350ml of 90% ethanol for 3hrs. and transferred to percolator with addition of 150ml of 90% ethanol for maceration for 7 days with occasional stirring. Finally ethanolic extract was collected and concentrated to get blackish green residue. The extract was stored in the airtight container at cool and dark place.

**2] Preparation of Turmeric extract**

Dried rhizomes of turmeric were ground and the powder obtained was followed for extraction same as that for neem leaves extract. The extract with crimson red colour was obtained and stored at cool and dark place in air tight container

**3] Preparation of aloe vera extract -**

The fresh aloe vera leaves were collected from plant, washed in the running tap water for 15 min then it was rinsed with sterile distilled water and mild chlorine solution then dissected longitudinally and the colourless parenchymatous tissue aloe gel was scraped out using sterile knife, thick epidermis was selectively remove and gel like pulp separated with spoon, minced and homogenized in mixer of wool fat, cetyl Alcohol

**Formulation of Ointment<sup>39</sup>**

A) Initially ointment base was prepared by weighing accurately grated hard paraffin which was placed in evaporating dish on water bath. After melting of hard paraffin remaining ingredients were added and stirred gently to aid melting and mixing homogeneously followed by cooling of ointment base.

SR.NO	Name of Ingredient
1	Wool Fat
2	Cetostearyl Alcohol
3	Hard Paraffin

4	Yellow soft paraffin
5	Mineral oils
6	Allantoin
7	Xanthan gum
8	Indigo carmine

B] Herbal ointment was prepared by mixing accurately weighed Neem, Turmeric and Aloe vera extract to the ointment base by levigation method to prepare a smooth paste with 2 or 3 times its

weight of base, gradually incorporating more base until to form homogeneous ointment, finally transferred in a suitable container<sup>40</sup>.

S.NO	Name of Ingredient
1	Prepared Neem extract
2	Prepared Turmeric extract
3	Prepared Aloe vera extract

## II. CONCLUSION

In this review, we systematically discussed the role of rheumatoid arthritis (RA) disease treatment. traditional Chinese medicine TCM classifies the subtypes of RA through its own theoretical method, which is beneficial for more accurate diagnosis and treatment with Chinese herbal medicines that are more suitable for different syndromes. TCM mainly uses a flexible combination of CHMs to play an important role in RA treatment. The main components of these extracts can be subdivided into alkaloids, flavonoids, triterpenes, saponins and other compounds. Using a platform of transgenic and induced arthritis models, we explore the potential mechanisms of TCM against RA with the help of omics analysis techniques and methods. These mechanisms are mainly CHM and its extracts can inhibit RA patients and experimental animal models, including synovitis, vascular proliferation and bone injury; this involves many biological

signal exchange targets and pathways. In conclusion, the role of TCM in RA treatment mainly involves reducing the expression and secretion of pro-inflammatory factors, thus decreasing the degree of abnormal immune. These herbal remedies are therefore entirely natural and will definitely reduce the pain and inflammation in the joints. If the patient wants to take any medication regarding this problem, taking good care of the joints and exercising regularly will help reduce the risk of rheumatoid arthritis. From the ancient time Aloe vera, Turmeric, and neem was using to treat inflammation, osteoarthritis, Alzheimer disease, eye infection, joint pain, anti-microbial agent, antiseptic. Ointments are a class of semi-solid dosage forms meant for external application to the skin or mucous membrane. Ointments contain medicament or medicaments, suspended, emulsify or dissolved in a base Topical product used for the treatment of common skin infection. Ointment plays important

role in the topical drug delivery system they decrease the systemic side effect, prolong and pronounced local action, and also avoids the first pass metabolism. Various formulations of ointments are taken for optimization in relation to ointment base consistency, ointment stability, stability with antioxidant, stability with different preservatives, better diffusion, and antifungal and antiseptic properties. The formulation consideration of ointment was reviewed. Different local plants were taken and their extract incorporated in the most effective ratio in appropriate base. The herbal remedies are therefore entirely natural and will definitely reduce the pain and inflammation in the joints. Taking care of the joints and exercising regularly will help to reduce the risk of rheumatoid arthritis. From the ancient time Aloe vera, Turmeric and neem to treat the inflammation

#### REFERENCES: -

- [1]. Indian Medicinal Plants, A Compendium of 500 species, Orient Longman Ltd., Madras, 1995; 5, 311.
- [2]. Leon Lachman, Herbert A. Lieberman, The Theory and Practice of Industrial Pharmacy
- [3]. Chandni Ravikumar/Chandni. & Res. Vol2(9)2014(Rheumatoid Arthritis)
- [4]. Silman A.J. Hochberg M.C. Epidemiology of the rheumatic diseases. 2nd edition. Oxford University Press, 2001
- [5]. Carbonell J, Cobo T, Descalzo MA, et al. The incidence of rheumatoid arthritis in Spain: results from a care registry. *Rheumatology* 2008; 47: 1088–1092.
- [6]. Smalt et al. Essentials of pharmaceutical Technology, II End, 2018, pharma med press Hyderabad.
- [7]. Ansel' pharmaceutical Dosage Form and Drug Delivery Smalt et al. Williams and Wilkins.
- [8]. Indian pharmacopoeia 2018 (2018). Indian pharmacopoeia commission Banker, G, S, Seemann, J, AND Rhodes, C, (2002).
- [9]. Pharmaceutical packaging trends eBook.
- [10]. Review article of ointment base, Melgaard de Villiers, research gate, 2009, book- A Practical Guide to contemporary pharmacy practice. edition:3
- [11]. [http://arthritis.ca/getmedia/6c39edce-5b2d-498d-bd60\\_28d33f3e1850/Rheumatoid-Arthritis-Causes-Symptoms-andpdf?ext=.pdf](http://arthritis.ca/getmedia/6c39edce-5b2d-498d-bd60_28d33f3e1850/Rheumatoid-Arthritis-Causes-Symptoms-andpdf?ext=.pdf)
- [12]. <http://www.hopkinsarthritis.org/arthritis-info/rheumatoid-arthritis/ra-pathophysiology-2/>
- [13]. Vijaykumar M. Kale and Ajay G. Named antiarthritic effect of galanin Isolated from rhizomes of *Alpinia officinarum* in complete Freund's adjuvant-induced arthritis in rats. *Int J Pharm Pharm Sci*, 2012; Vol 6, Issue 4, 499-505.
- [14]. <http://easyayurveda.com/2014/12/10/agaru-aquilaria-agallocha-uses-research-side-effects/>
- [15]. Habiba Rahman, M. China Sariah, A. M. Dutta Anti-arthritis activity of leaves and oil of *Aquilaria agalloch* Saudi J. Life Sci 2016; Vol-1, Iss-1:34-43.
- [16]. Rajidae, S., Nagore, B.P., Singh, G.K., Dubey, B.K., Desai, P. & Jain, S. A review on *Argemone Mexicana* an Indian medicinal plant. *International Journal of pharmaceutical sciences and Research*, 2012; 3(8): 2494-2501.
- [17]. Anonymous, The Wealth of India raw materials (SP-W) volume X. publication and information directorate, C.S.I.R New Delhi; 1976.
- [18]. Chaturvedi GN, Singh RH, Indian journal of Medical Research. 1965; 53: 71.
- [19]. Schaible H-G, Ebersberger A, Segond von Banchet G: Mechanisms of pain in arthritis. *Ann NY Acad Sci*. 2002, 966: 343-354.
- [20]. Vanegas H, Schaible H-G: Prostaglandins and cyclooxygenases in the spinal cord. *Prog Neurobiol*. 2001, 64: 327-363. 10.1016/S0301-0082(00)00063-0.
- [21]. Hanzal R, Luckett C, Rippler H, Schaaf KD, *Phytochemistry*. 1965; 4: 19.
- [22]. K.M. Verghese Publication, 1990
- [23]. The Pharmaceutical and Compounding laboratory, Preparation and Evaluation of Drugs Release, [www.pharmlabs.unc.edu/labs/ointment/objectives.htm](http://www.pharmlabs.unc.edu/labs/ointment/objectives.htm)
- [24]. *International Journal Of Research and Review* Vol.7; Issue 1; January 2020, Curcumin: A Review for Health Benefits
- [25]. M. Ostovar, M.J. Raee, M. H. Hashempur, J. G. Mayer, and M. Heydari, "Cinnamon: a systemic review of adverse events", *clinical nutrition*, vol 38, no. 2, page no. 594-602, 2019. View at Publisher site | google scholar
- [26]. Aulton ME (Ed), *Pharmaceutics, The science of dosage form design*, Iledn, Churchill Livingstone, London, 2006, pp-113-122.. Niazi SK, *Handbook of Preformulation*, Informa Health Care, 2007, pp-197- 206.
- [27]. Panayi GS, Lanchbury JS, Kingsley GH.



- The importance of the T cell in initiating and maintaining the chronic synovitis of rheumatoid arthritis. *Arthritis Rheum* 1992; 35: 729-35
- [28]. Ebersberger A, Grubb BD, Willingale HL, Gardiner NJ, Nebe J, Schaible H-G: The intraspinal release of prostaglandin E2 in a model of acute arthritis is accompanied by an upregulation of cyclooxygenase-2 in the rat spinal cord. *Neuroscience*. 1999, 93: 775-781. 10.1016/S0306-4522(99)00164-5.
- [29]. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. Philadelphia: Lipincott Williams and Wilkins.
- [30]. Lipincott Williams and Wilkins.
- [31]. Comelles F, Pascual A. Micro emulsion-based media as novel drug delivery system. *Adv. Drug Del. Rev.* 1996;45:89-121.
- [32]. Becher Paul. Encyclopedia of Emulsion Technology. Volume 4. Marcel Dekker, Inc. New York: 1996.
- [33]. Akers MJ, Larrimore Daniel S, Guazzo DM. Parenteral Quality Control Sterility, Pyrogen, Particulate, and Package Integrity Testing, III Edn, 2003, Marcel Dekker, Inc. New York, Basel, US.
- [34]. Brahn E, Trentham DE. Experimental synovitis induced by collagenspecific T cell lines. *Cell Immunol* 1989; 118: 491-503
- [35]. Semalty et al., Essentials of Pharmaceutical Technology, II Edn, 2018, Pharma Med press, Hyderabad, India, ISBN9789386819994.
- [36]. Boylan JC, Nail SL, In; Banker GS, Rhodes CT (Eds). *Modern Pharmaceutics*. 2005 (Vol. 121) Marcel Dekker, Inc. New York, Basel, US, pp381-414.
- [37]. Chapman DG, In: Winfield AJ, Richards RME (Eds). *Pharmaceutical Practice*, 3<sup>rd</sup> Edn, 2004, Churchill Livingstone, New York, pp.247-63.
- [38]. Swarbrick, J. (2013) *Encyclopedia of pharmaceutical technology*. CRC Press.
- [39]. *Pharmaceutical Capsules*. Edited by Fridrun P odczek, Brian E. Jones. Pharmaceutical Press .ISBN: 9780853695684
- [40]. *Indian Pharmacopoeia* 2018. (2018). Indian Pharmacopoeia Commission.
- [41]. Banker, G. S., Siepmann, J., & Rhodes, C. (2002). *Modern Pharmaceutics*. CRC Press.
- [42]. Semalty et al., Essentials of Pharmaceutical Technology, II Edn. Pharma Med press, Hyderabad, India, ISBN9789386819994
- [43]. World Health Organization, Geneva; Quality Control Method for Medicinal Plant Materials, A.I.T.B.S. Publisher and Distributors, New Delhi. 2002; 8-24.
- [44]. Carbonell J, Cobo T, Descalzo MA, et al. The incidence of rheumatoid arthritis in Spain: results from a nationwide primary care registry. *Rheumatology* 2008; 47: 1088–1092.
- [45]. Solinger AM, Hess EV. HIV and arthritis. *Arthritis Rheum* 1990; 17: 562
- [46]. Rasch EK, Hirsch R, Paulose-Ram R, et al. Prevalence of rheumatoid arthritis in persons 60 years of age and older in the United States. *Arthritis Rheum* 2003; 48: 917–926.
- [47]. Anonymous a, 2013, Handout on Health: Rheumatoid Arthritis 5. Anonymous b, n.da, Lifestyle and home remedies of Rheumatoid Arthritis 6. Badsha H, Chhabra V, Leibman C, et al, 2009, Rheumatoid Arthritis and Complementary Health Approaches
- [48]. Natural herbal treatment for Rheumatoid Arthritis -A Review, publish in 2017.