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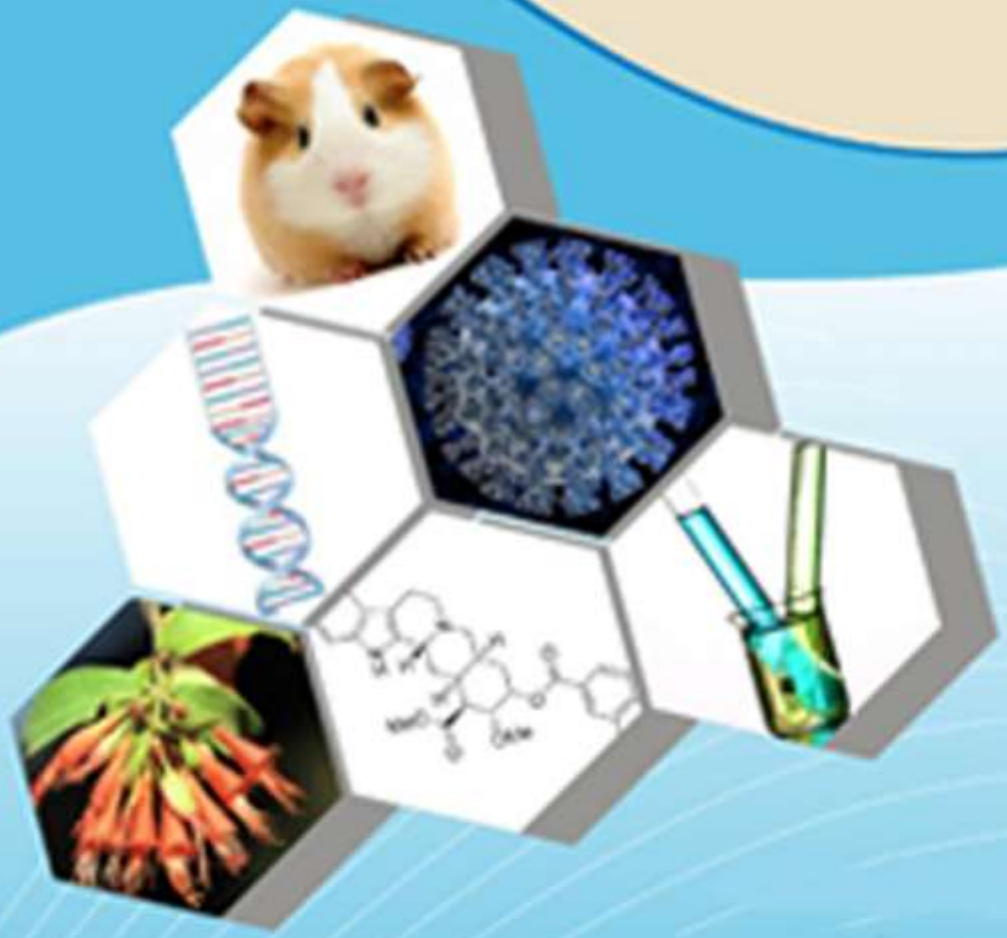

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EXTRACTION, CHARACTERIZATION AND ACTIVITY OF *CAPSICUM ANNUM* ON RHEUMATOID ARTHRITIS

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Abstract:

Background:

This study report was on plant of Capsicum annum, widely cultivated Capsicum annum *important as a vegetableand spice crop world-wide,it is one of the most diverse crops.*

The aim of this study was to investigate, extraction and characterization of Capsicum Annuum. The characterization by preliminary study, extraction of chemical constituents from the plant and find out the chemical constituents which help in treatment of rheumatoid arthritis. Rheumatoid arthritis (RA) is a long lasting inflammatory disorder characterized by joint swelling, joint compassion, and devastation of synovial joints, leading to severe disability and premature mortality it shows limited motion and function of joints.

Keywords: *Capsicum Annum, , Soxhelation Extraction, Characterization, Rheumatoid arthritis.*

INTRODUCTION:

Rheumatoid Arthritis:

Arthritis in Greek word means “arthr” meaning joint and “itis” meaning inflammation, in simply can say arthritis means inflammation on joints. And the term *Inflammation* means “*surface*” phenomenon produced by immunological and non-immunological stimuli, capable of initiating both humoral and cellular systems, normally present in the body in an inactive state and regulated by systemic inhibitors or Pain ,stiffness, redness and swelling [1].

Symptoms:

The stiffness seen in active RA is most frequent nastiest in the morning. It may precede one to two hours. Stiffness for an elongated time in the morning is a suspicion that you may have RA, while few otherarthritic disorders work this way.

Some of the common symptoms of RA are: Pain on joints, Swelling, Exhaustion, frustration and gloominess, Flu like symptoms feeling hot, ill and sweating, Anemia

The symptoms which are less common are: - Loss of weight, Swelling on eyes, Rheumatoid nodules (fleshy lumps below the elbows or on hands and feet)[2].

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Causes:
As Rheumatoid arthritis is autoimmune disorder ; as we know that the immune system of our body have the defending mechanism against foreign bodies; but in case of RA, the immune system start damaging own tissues instead of attacking germs and viruses which causes swelling .Also different autoimmune disease attack different parts of body tissue but RA only affect joints.
Although physician are not confirm about the exact cause of rheumatoid arthritis, it's thought that it may result from a combination of genetics and environmental triggers (smoke ,eat a lot of red meat, drink, a lot of coffee)[3].

PLANT PROFILE:

Capsicum annuum:-

Scientific

Classification:

Kingdom	:	Plantae
Class	:	Eudicots
Subclass	:	Asterids
Family	:	Solanaceae
Genus	:	Capsicum
Species	:	C. annuum

Fig 1: Plant and fruit of Capsicum

annumSynonym:
chillies, bell peppers, green peppers, red peppers, umbrella chilli in Tamil & in India Shimla.

Biological Source:
Capsicum consists of dried ripe fruits of *Capsicum annu* Linn.var: *minimum*, belonging to family Solanaceae. It contains not less than 12% of non volatile ether soluble extractives [4].

Geographical Source:
Capsicum is cultivated in almost all the tropical countries. East Africa, West Africa and India are the regions producing the drug on commercial scale. In India, it is grown in Andhra Pradesh, Uttar Pradesh, Gujarat, Maharashtra, Assam and Tamil Nadu.

Macroscopical characters:

Colour	Dull orange red to brownish-red
Odour	Characteristic
Taste	Pungent
Size	About 12 to 25 cm in length and up to 7mm in width
Shape	It is conical or oblong

Table 1: Macroscopical characterization ofCapsicum annum

Phytochemical constituents:
Capsicum contains about 0.5 to 0.9% colourless, crystalline and pungent principle, known as capsaicin which is volatile above 65°C. Capsicum also contains fixed oil (4 to 16%),proteins and pigments, viz. capsanthin and carotene. Pigments are responsible for red colour. Thiamine and ascorbic acid are the other contents of the drug.

Uses:
1) It is used as a carminative, an appetizer and astomachic.
2) Externally, it is used as a counter irritant in thetreatment of rheumatism, lumbago and neuralgia.
3) It is also used in spices [5].

Article Review:
1) Maria de Lourdes Reyes-Escogido et.al; has showed "Capsaicin is a unique alkaloid found primarily in the fruit of the *Capsicum* genus and is what provides its spicy flavor. Generally extracted

directly from fruit, high demand has driven the use of established methods to increase production through extraction and characterization. Over time these methods have improved, usually be applying existing techniques in conjunction. An increasingly wide range of potential applications has increased interest in capsaicin" [6].

2) Enkelejda Goc, Entela Haloçi, et al; has showed "Capsicum (due to its capsaicin content) is currently used for various therapeutic purposes such as asthma, coughs, sore throats, to relieve toothaches, counter- irritant balm for external application, to alleviate pain in shingles, rheumatoidarthritis, diabetic neuropathy, etc. The pungent components responsible for the medical uses are the alkaloids called capsaicinoids. Isolation of capsaicin from Capsicum fruits was described by many authors with different methods of extraction. The most used methods are maceration, Soxhlet extraction, supercritical fluid extraction (CO2) and ultrasound the best solvents were ethanol and methanol."

3) Zeid Abdullah Al Othman, Et.al; has showed "Theaim of the present study was to determine the content of capsaicin and dihydrocapsaicin in *Capsicum* samples collected from city markets in Riyadh (Saudi Arabia), calculate their pungency in Scoville heat units (SHU) and evaluate the average daily intake of capsaicin for the population of Riyadh. The investigated samples consisted of hot chillies, red chillies, green chillies, green peppers, red peppers and yellow peppers. Extraction of capsaicinoids was done using ethanol as solvent, while high performance liquid chromatography (HPLC) was used for separation, identification and quantitation of the components. The limit of detection (LOD) of the method was 0.09 and 0.10 µg/g for capsaicin and dihydrocapsaicin, respectively, while the limit of quantification (LOQ) was 0.30 and 0.36 µg/g for capsaicin and dihydrocapsaicin, respectively" [7].

Fig 2: Exaction of Capsicum annum.

METHOD OF EXTRACTION:

1) Extraction method for *capsicum annum*: -

A. By Soxhelation method:

- Dry the fruits of capsicum annum and weighabout 100gm of dried fruits.
- Fill the dried fruit in the soxhelation apparatus with ethanol about 250-300ml in RBF and boil it at 50-60°C temperature for 5-6 hrs.
- Collect the crud syrup mass of extract at the bottom of flask.

B. By Maceration:
Take fresh fruits of *Capsicum annum* wash it properly & weight it in 2.5 grams and dissolve it in 25ml of ethanol, macerate it for 24 hours to get activeconstitute out of it.

Evaluation Of Preparations:-

1. Measurements of pH:
2.5gm Ointment sample was taken in 100 ml dry beaker, and then 50 ml water was added to it. Beaker was heated on water bath maintained at about 60ºC to 70ºC for 10 minutes, cooled to room temperature. Then pH measurements were done by using a digital type pH meter by dipping the glass electrode into the ointment formulation.

2. Determination of viscosity:
The measurement of viscosity of the formulated Ointment was done by using Brookfield Viscometer. Spindle No. S63 and S64 were used for the determination of viscosity of ointment. Spindle was rotated at different rpm for 30 second for each measurement. The results are shown in Table 2 and 3 below.

3. Determination of extrudability:
Extrudability test is the measure of the force required to extrude the material from a collapsible tube when

certain amount of force has been applied on it in the form of weight. In the present study the quantity in percentage of cream extruded from the tube on application of certain load was determined. More the quantity extruded, better was the extrudability of ointment.

4. Determination of spreadability:
One of the criteria for a cream, ointment or gel is that it should possess good spreadability. Spreadability is a term expressed to denote the extent of area to which the cream readily spreads on application to skin or affected part. The therapeutic efficacy of a formulation also depends on its spreading value. Hence determination of spreadability is very important in evaluating ointment characteristics. Special apparatus was designed to study the spreadability of ointment formulations. The spreadability is expressed in terms of time in seconds taken by two slides to slip off from ointment, placed in between the slides under the direction of certain load. Lesser the time taken for separation of two slides, better the spreadability of ointment.

5. Patch test:
This is done by shaving the mice and applied Capsicum Ointment.

Before Application of Dosage form:	After Application of Dosage form:
	

RESULT & DISCUSSION:
Results and Discussion Determining the PH, Viscosity, Spreadibility and extrudability, and the results are shown in Table 2 and 3.

Preliminary Studies of Extract:

Chemical Constituents:

Table 2: Chemical test and inference of Capsicum annum.

S.N.	Phytochemicals test.	*Inference*
1.	**Alkaloids:**	
	Wagner's Test	+
	Hager's Test	+
	10% Tannic acid test	+
2.	**Phenolic compound**	+
3.	**Fixed Oil:** Saponification test	+
4.	**Steriods:** Salkowski test	+
5.	**Carbohydrate:**	
	Molish Test	+
	Solubility	+
	Interconversion Test	+
6.	**Protein:**	
	Ninhydrin test	–
	Million reagent test	–
7.	Volatile oil	–
8.	Gums	–

Evaluation of *Capsicum Annum* Ointment:

1. Measurements of pH:
pH was obtained as **5.84**.

2. Determination of viscosity:
The viscosity of ointment was determined by using spindle no 63 & 64.

Table 3: viscosity of ointment in spindle S63 and S64

S.N.	RPM	Spindle S63		Spindle S64.	
		Torque (%)	Viscosity(P)	Torque (%)	Viscosity(P)
1	0.3	42.4	848000	–	–
2	0.5	57.2	686000	–	–
3	0.6	54.6	545900	6.5	65000
4	1.0	68.3	409700	17.3	10380
5	1.5	47.4	189600	26.1	10440
6	2.0	59.2	177600	22.1	66300
7	2.5	63.1	151400	40.8	97900
8	3.0	54.0	108000	42.6	85200
9	4.0	67.3	100900	52.4	78600
10	5.0	93.9	117300	56.7	68000
11	6.0	82.5	82460	59.4	59300
12	10	81.5	51716	63.5	37450

3. Determination of extrudability:
The extrudability of ointment was obtained as **85%.**

4. Determination of spreadability:
The spreadability of ointment was found to be **4.5 gmcm/sec.**

5. Patch test on mice:
No change was found in mice.

CONCLUSION:

In this project ethanolic extract of *Capsicum annum* was obtained by soxhelation and preliminary work had done in which chemical constituents like alkaloids, fixed oil, phenolic compound, steroids and carbohydrates were found. Different parameters of phytochemical screening of herbs, their antioxidant properties and evaluated like PH, Viscosity, Speadibility, extrudability test were covered and result was as predetermined accept the patch test on mice that was negative.

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