The Effect of Chinese Herbs on Acne Pathogens

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ABSTRACT

Key Words：Chinese Herbs、Acne

Chinese herbs have been used for a long period of time and less side effects than synthesized chemical drugs. Therefore, using Chinese herbs as natural additives in cosmetics becomes popular in recent years. The methanol extracts of Scutellariae Radix, Lithospermi Radix, Lonicerae Flos, Andrographitis. Herba, Angelicae Dahuricae Radix, Ligustici Rhizoma et Radix, Hedyotis Diffusae Herba, Isatidis Folium, Magnoliae Liliflorae Flos, Forsythiae Fructus, Anmarrhenae Rhizoma, Spirodelae Herba, Gardeniae Fructus, Sophorae Flavescentis Radix, Coptidis Rhizoma, Prunellae Spica, Equiseti Hiemalis Herba, Gentianae Radix, Moutan Radicis Cortex, Fraxini Cortex, Lycii Radicis Cortex, Violae Herba, Lophatheri Herba, Matricariae chamomillae Flos, Taraxaci Herba and Scutellariae Barbatae Herba are used to test the efficiency of inhibiting acne pathogens.

Twenty-six Chinese herbs are extracted by methanol, and then condensed to dried powder. These extracts are divided into water-soluble part and DMSO soluble part. These two type solutions are tested for the effect on acne pathogens by paper disc diffusion method. The results show that the substances of water soluble part which are Coptidis Rhizoma, Moutan Radicis Cortex, Scutellariae Barbatae Herba have medium to high activity of inhibiting acne pathogents, and the substances of DMSO soluble part which are Coptidis Rhizoma, Ligustici Rhizoma et Radix, Sophorae Flavescentis Radix, Moutan Radicis Cortex, Scutellariae Radix, Scutellariae Barbatae Herba also have medium to high activity of inhibiting acne pathogens. Using Chinese herbs as natural additives in cosmetics is convenience and valuable application in cosmetceutical research and development. Therefore, it is worth that re-investigation and find out the potential of Chinese herbs being use in cosmetics.

Experiment

1、Solvent

(1)Methyl alcohol (Tedia) (2)Dimethyl sulfoxide, DMSO (Tedia) (3)Distilled water

2、Chinese herbs

(1)Scutellariae Radix (2)Lithospermi Radix (3)Lonicerae Flos (4)Andrographitis. Herba (5)Angelicae Dahuricae Radix (6)Ligustici Rhizoma et Radix (7)Hedyotis Diffusae Herba (8)Isatidis Folium (9)Magnoliae Liliflorae Flos (10)Forsythiae Fructus (11)Anmarrhenae Rhizoma (12)Spirodelae Herba (13)Gardeniae Fructus (14)Sophorae Flavescentis Radix (15)Coptidis Rhizoma (16)Prunellae Spica (17)Equiseti Hiemalis Herba (18)Gentianae Radix (19)Moutan Radicis Cortex (20)Fraxini Cortex (21)Lycii Radicis Cortex (22)Violae Herba (23)Lophatheri Herba (24)Matricariae chamomillae Flos (25)Taraxaci Herba (26)Scutellariae Barbatae Herba

3、Origin of acne pathogens

(1) *Propionibacterium acne* (CCRC 10723) (2) *Straphylococcus aureus subsp. aureus* (CCRC 10451) (3) *Straphylococcus epidermidis* (CCRC 10783) (4) *Malassezia furfur* (CCRC 22243)

4、Instruments

(1)Mini-Q water manufacturer (Barnstead Nano Pure II) (2)Freeze Dryer (FDU-128, EYELA) (3)Rotatory evaporator (Heidolph WB-2000) (4)Laminar flow (High ten 3HT-24) (5)Incubator (GT-306) (6)Colony Counter (Colony Counter 560 , Suntex) (7)Low temperature freezer (SO-LOW U85-22 Cincinnati Ohio USA) (8)CO2 Incubator (Lab-Line) (9)UV-VIS spectrophotometer (Perkin Elmer Lambda 12) (10)Millipore filter (25mm 0.45μm PVDF ; 25mm 0.45μm MCE, Millipore) (11)pH meter (Suntex sp-9)

5、Procedure

(1) Extract 26 kinds of Chinese herbs by methanol

Pulverize Chinese herbs and take the powder into round bottom flask. Add 10 times of methanol into the flask and place the flask at water bath keeping 70℃.Use condenser to condense methanol until 3 hours later. Filter and collect these methanol extract liquid. Residual Chinese herbs then add 10 times of methanol and repeat the extract procedure once again. Collect and combine two extract methanol liquid to concentrated at 40℃ until being semisolid. Dry these semisolid to powder in freeze dryer. Calculate percentage of methanol extract.

(2) 26 kinds of Chinese herbs testing Minimal Inhibitory Concentration (MIC) of acne pathogens

Prepare germ-free solution of water and DMSO soluble substances in 100mg/ml MeOH extract. Use paper disc diffusion method to select effective Chinese herbs. Then, prepare germ-free different concentration solution of water and DMSO soluble substances in these effective Chinese herbs MeOH extract. By test of Minimal Inhibitory Concentration, get the result of the lowest dosage to inhibit these acne pathogens.

Decide the effect of inhibiting acne pathogens via diameters degree of inhibitory zone(mm)
Diameter < 10mm, no inhibitory effect; Diameter = 10mm, low inhibitory effect;
Diameter = 11~15mm, medium inhibitory effect; Diameter > 15mm, high inhibitory effect

Result

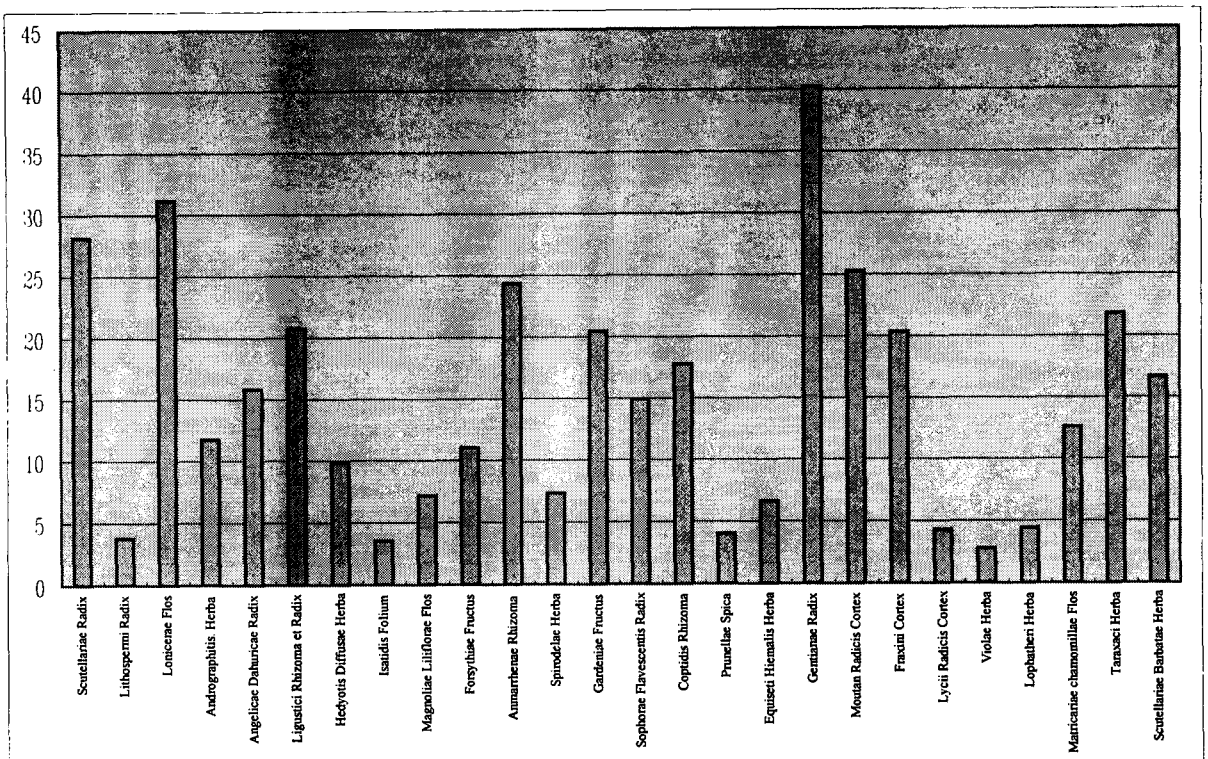

Fig.1 Percentage of herbs M e0 H extract

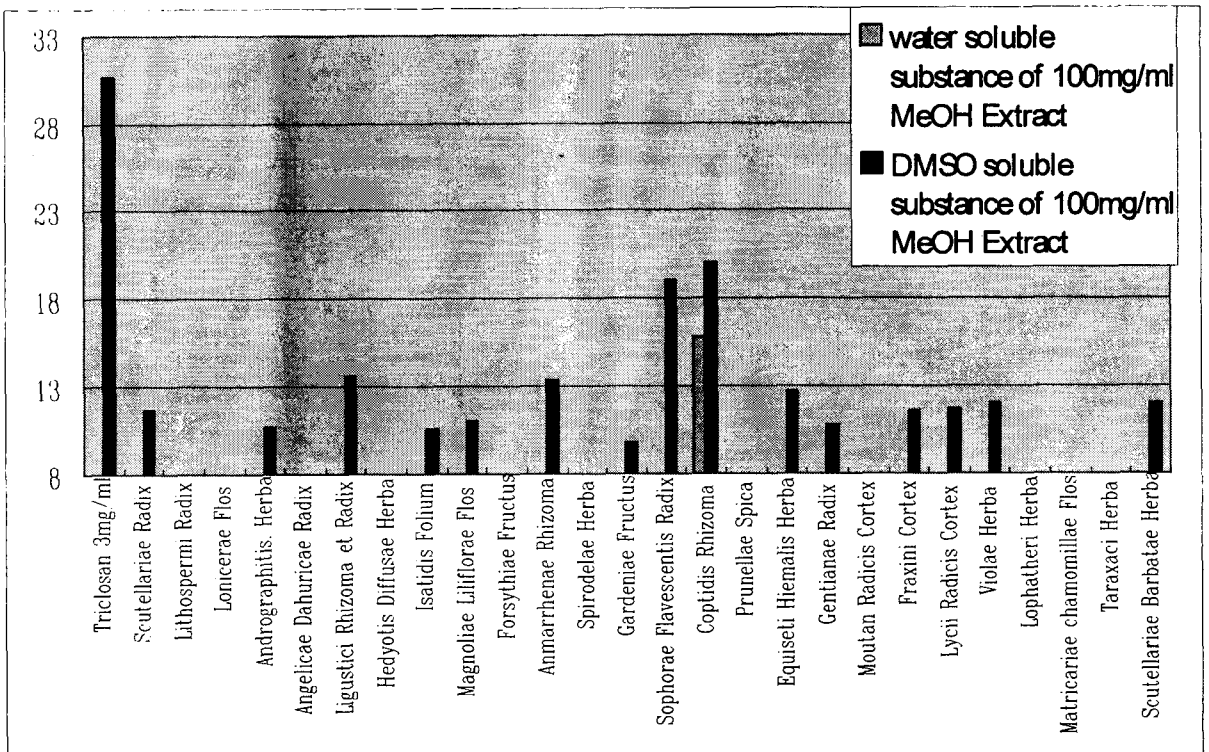

Fig. 2. C hinese herbs extract effect on propionibacterium acne

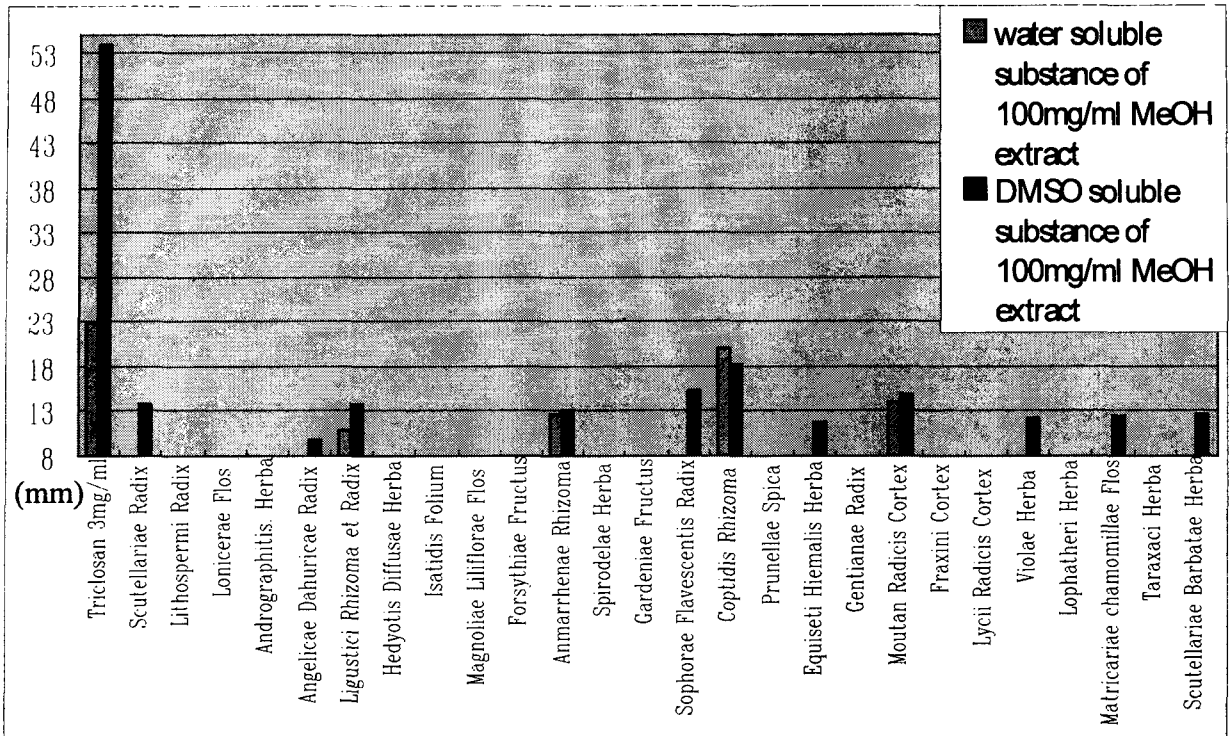

Fig. 3. Chinese herbs extract effect on staphylococcus aureus subsp. aureus

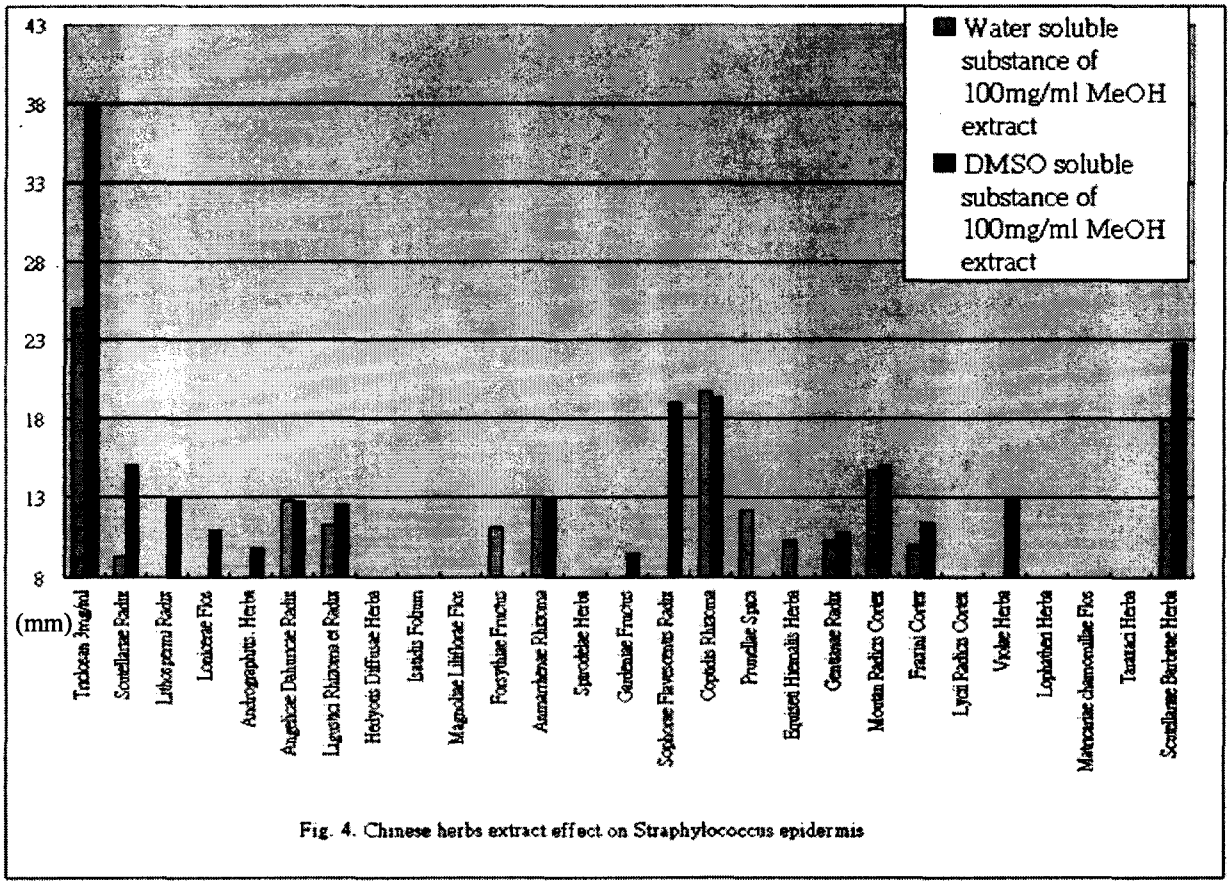

Fig. 4. Chinese herbs extract effect on Straphylococcus epidermis

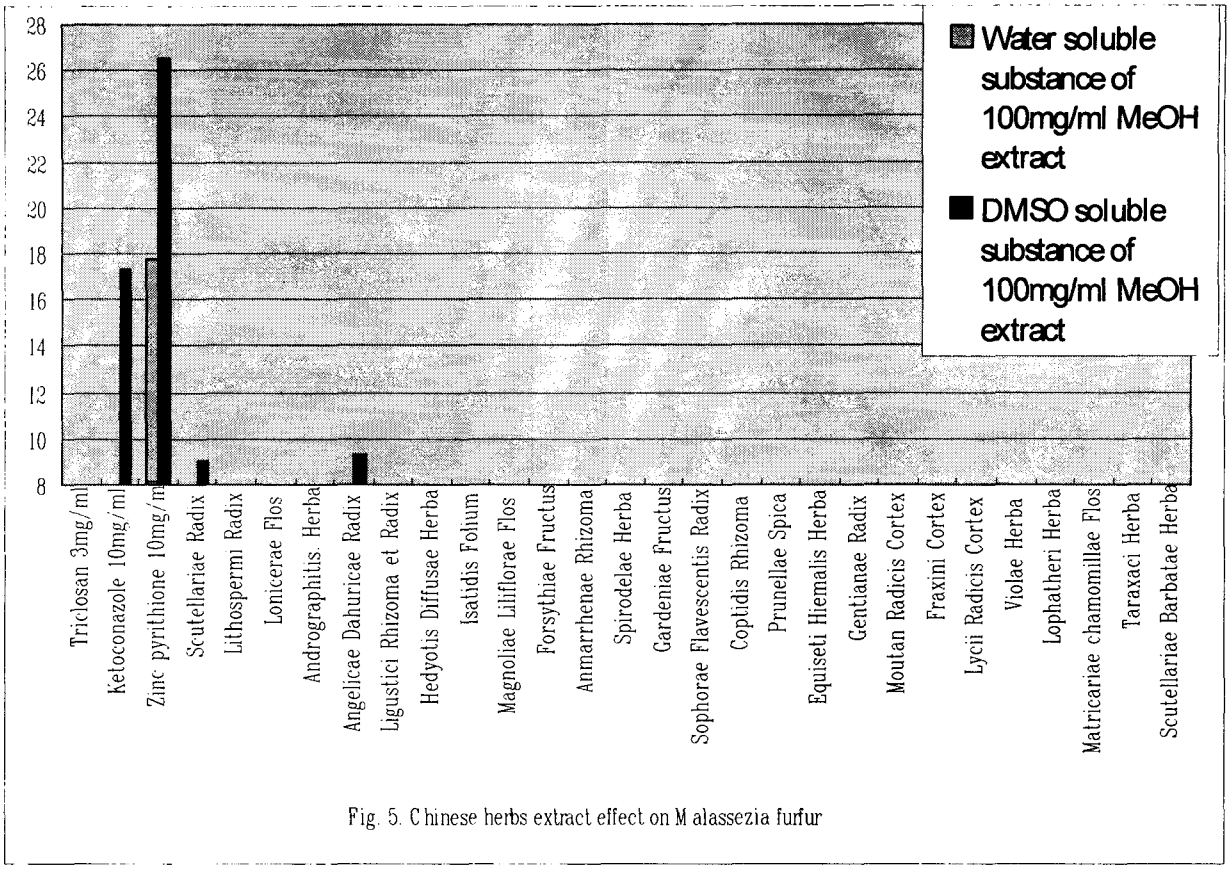

Fig. 5. Chinese herbs extract effect on Malassezia furfur

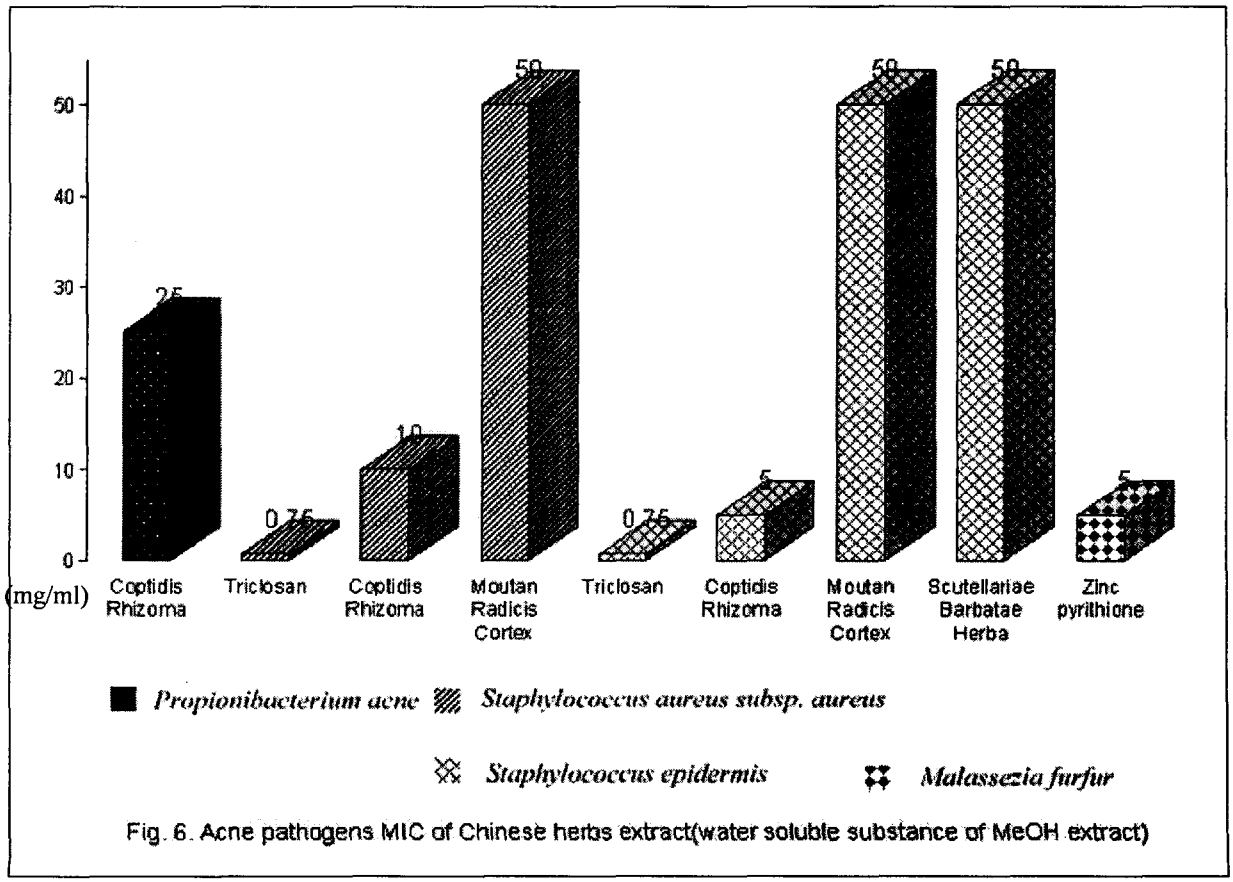

Fig. 6. Acne pathogens MIC of Chinese herbs extract(water soluble substance of MeOH extract)

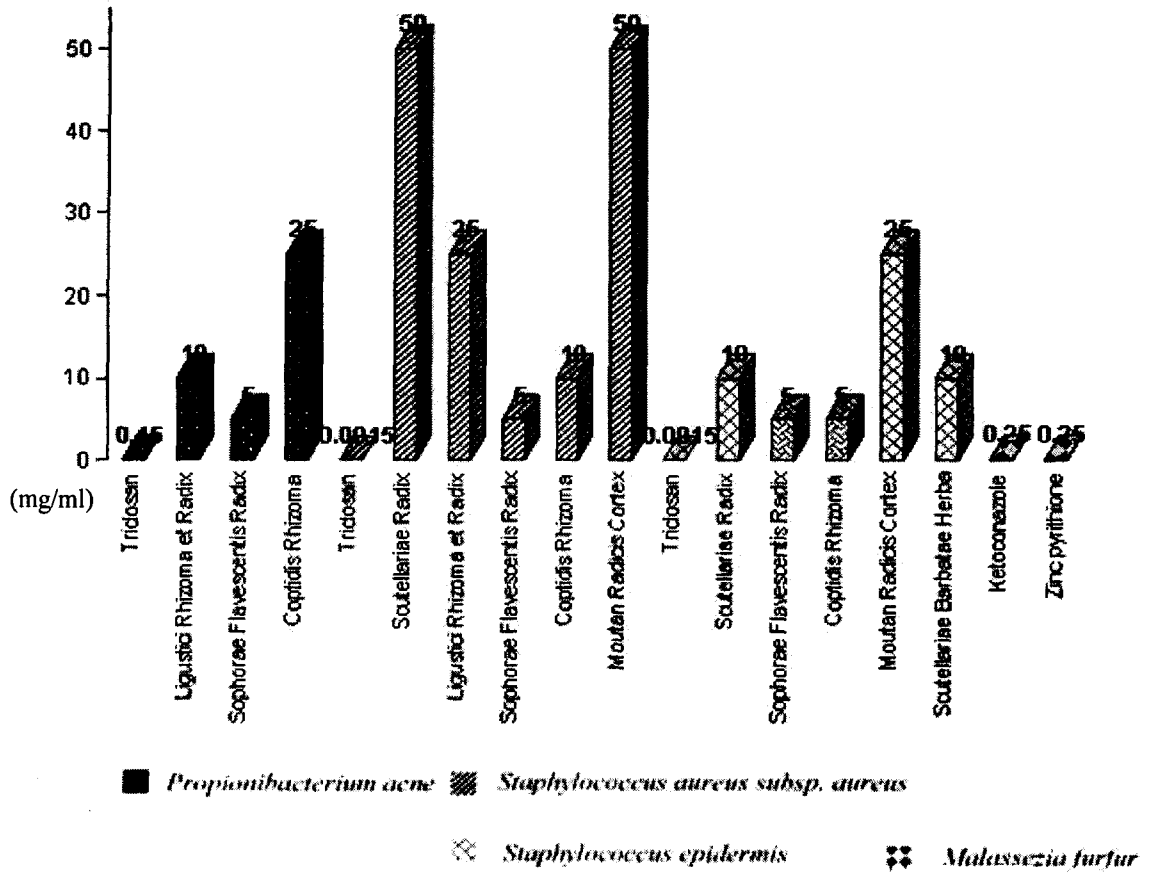

Fig. 7. Acne pathogens MIC of Chinese herbs extract(DMSO soluble substance of MeOH extract)

Discussion

Calculating percentage of Chinese herbs methanol extract can be useful for effective and economical consideration. In the inhibiting acne pathogens experiment, we use paper disc diffusion method in a standard of 100mg/ml to select active Chinese herbs. Then, via Minimal inhibitory concentration, get the result of the lowest dosage to inhibit these pathogens.

We also split 26 kinds of methanol extract into water-soluble part and DMSO -part and test which Chinese herbs has the better effect of inhibiting acne pathogens. From Fig. 6 and Fig.7 getting DMSO-part possessing more active samples than water-soluble samples, therefore, we can infer DMSO have ability to extract more inhibitory acne

pathogens compounds.

We use contrast group of anti-fungus medicine, for example zinc pyrithione and ketoconazole, to inhibit yeast (*Malassezia furfur*), because these medicine have more effective and different mechanism to inhibit fungus than Triclosan. In the anti-acne pathogens experiment, we use the highest concentration of methanol extract that is 100mg/ml. Therefore, the higher concentration or the different solvent extract maybe possess effective inhibitory possibility.

Result

With these inhibitory acne pathogens data, we can understand DMSO-soluble substances are more effective than water-soluble ones. In other words, there are more active compounds of Chinese herbs methanol extract dissolving in DMSO. We make conclusions that water-soluble substances of Chinese herbs methanol extract being medium to high effective are Coptidis Rhizoma, Moutan Radicis Cortex and Scutellariae Barbatae Herba and that DMSO-soluble substances of Chinese herbs methanol extract being medium to high effective are Coptidis Rhizoma, Ligustici Rhizoma et Radix, Sophorae Flavescentis Radix, Moutan Radicis Cortex, Scutellariae Radix and Scutellariae Barbatae Herba. Therefore, these Chinese herbs are potential new selective for acne patient to use.

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