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ON TUBERCULOSIS PATIENTS**

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**Research Journal Specific Education**

**Faculty of Specific Education**

**Mansoura University**

**ISSUE NO. 54, APRIL. 2019**

مجلة بحوث التربية النوعية - جامعة المنصورة

العدد الرابع والخمسون - أبريل ٢٠١٩

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## **EVALUATION OF THE THERAPEUTIC EFFECT OF SOME HERBAL AND FOODS ON TUBERCULOSIS PATIENTS**

***EL- Zainy, A.R.M., Mona Y. A. Mostafa and EL-Shekety, F.M.M.\****

### ***Abstract***

This study was conducted to determine the effect of treatment of certain foods and herbs in treatment and improving the health status of tuberculosis patients. The study was conducted on 60 patients in Mansoura Chest Hospital – Dakahlia governorate of both sexes (48 males, 12 females) aged 18-60 years. Some physical measurements of weight, length and clinical examinations were conducted by hospital doctors. Some laboratory tests were carried out on blood samples of the patients to identify the proportion of hemoglobin and hematocrit. Also the sputum samples were taken to estimate the extent of tuberculosis incidence. Patients were divided into four equal groups (15 patients each) as follows: group1 (positive control group) fed on hospital meal only. Group 2 was fed on the hospital meal in addition to the herbal mixture drink (echinace, juniper, honeysuckle and horehound) 3 times daily. Group 3 was fed on the hospital meal in addition to the mixture of liquid consisting of honey bee, grounded yellow fenugreek, peanut and goat's milk 3 times a day. Group 4 was fed on both the mix of herbs and the liquid mixture. All the four groups continued on the hospital drugs beside food treatments over the period of the experiment (3 months). The herbs mixture and liquid mixture were subjected to sensory evaluation and chemical analysis to identify their contents of protein, fiber, ash, moisture and fat. All the mentioned tests were run during the first and second months of the experiment and at the end of the trial period (3 months). The combination of herbs showed the best results in the elimination of the tuberculosis bacteria. Meanwhile, the liquid mixture recorded the best results in improving hemoglobin and hematocrit and increasing the weight of normal TB patients. Based on the results, mixed

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herbs and liquid mixture can be used together side by side with hospital medicines to improve the patients' health status in a short period of time.

**Key words:** Tuberculosis, Juniper, Horehound, Echinacea, Sputum examination, Peanut, Fenugreek, Hemoglobin, Hematocrit, Therapeutic effect.

## **INTRODUCTION**

Tuberculosis (TB) is a disease, which is caused by the bacterium tuberculosis. It was reported that around 10% of the latest infections happens to active disease that, if it isn't treated, it can destroy around fifty percent of the infected people. There are some usual symptoms of active TB such as chronic cough with fever, bloody sputum, weight loss, and night sweats (**Konstantinos, 2010**). Patients with tuberculosis have some symptoms as appetite reduction, micronutrient malabsorption, and altered metabolism which leads to wasting. Patients with malnourished tuberculosis have postponed recovery and higher levels of mortality than the well-nourished patients. Designated that there is a link between tuberculosis and both malnutrition and overcrowding; that makes it one of the most dominant diseases over the poor (**Hossain et al., 2010**). The most affected ones by tuberculosis are the poorest people from the poorest countries. They are not only exposed to the disease because of their living and working conditions, but they are also plunged deeply into poverty as a consequence of TB (**Halezeroğlu and Okur, 2014**).

Honeysuckle is used as a treatment for inflammation, swelling, colds, fever, sores, boils, viral and bacterial infections. Nowadays, this honeysuckle is considered as a proven antibiotic. It is a considered as a broad-spectrum antibiotic for bacteria (**Jin et al., 2006**). Horehound can be used as a cure for symptoms that are inflammatory-related as fever, flue and sore throat. It is used for respiratory problems like cough and asthma (**Pukalskas et al., 2012**). Echinacea's role is to confirm immune system function to lighten the flu period and severity. It has many physiological properties among which are; the stimulation of phagocytosis, cytokine production, and anti-inflammatory function (**Perry et al., 2002**). Juniper

used for dyspepsia, it has digestive, stomachic, and antirheumatic functions. Because of these antiseptic functions it is used as an antimicrobial activity of the essential juniper against some bacteria (**Angionl et al., 2003**).

Fenugreek is recognized to have many pharma-cological functions such as hypoglycemia gastroprotective, hypocholesterolemia, chemopreventive, anti-oxidant anti-inflammatory, antipyretic, laxative and appetite attributes (**Basch et al., 2003**). Goat's milk should be used regularly by people, who have problems with malabsorption issues, osteoporosis, anemia, or prolonged treatments also with iron supplements (**Angelis et al., 2006**). Honey as a therapy can be used for wound healing, cough, sore throat, topical antiseptic, laxative action, prevention and treatment of scars. Most microorganisms do not grow in honey, so sealed honey does not spoil, even after thousands of years (**Chen et al., 2000**).

**Aim of the study:** This study aims to speed healing of tuberculosis and eliminate the bacteria that causes it, using some herbs and foods with therapeutic effect on the disease.

#### **Material and Methods:**

**Materials: The raw materials:** Honey white (ISIS Co, Egypt), goat milk (Nestle Egypt), peanut and fenugreek were purchased from local market of different areas in Mansoura city Egypt. Echinace (*Echinacea purpurea*), honeysuckle (*Lonicera spp*), horehound (*Marrubium vulgare*) and juniper (*Juniperus communis L, cupressaceae*), were obtained from the National Research Center, Giza, Egypt.

**Patients:** Experiments were conducted on 60 tuberculosis patients of both sexes (48 male and 12 female) aged 18:60 years reserved at Mansoura Chest Hospital.

#### **Methods**

**Preparation of raw materials:** Echinace, honeysuckle, horehound and juniper were grinded well until become soft powder then sieved. Peanuts were crushed and grinded, fenugreek was grinded, goat milk was mixed and filtered then pasteurized at 75c for five minutes. . **Preparation of herbal mix:** The mixture contains four herbs: (echinace, juniper,

honeysuckle and horehound). It was mixed in to soft powder and then wrapped in paketas containing each baguette on 4 g of herbs in equal proportions 1 g per herb. They were kept in plastic bags in a dry and cool atmosphere for use. Herbs were saved in coldness, dryness and darkness to protect them from oxidation. The herbal mixture was soaked in a cup (200 ml) of boiling water for 10 minutes before drinking.

**Preparation of liquid mixture:** The liquid mixture contains (honey bee, grounded yellow fenugreek, peanut and goat's milk) was prepared as follow; 5g crushed peanuts and 10 g grounded fenugreek mixed with 20 g honey then added to cup (200 ml) of (boiled goat's milk and boiled water).

*Body measurements:*

**Body weight:** weight was measured using beam balance. The TB patients were weighed to the nearest kilogram without shoes and in light clothes the scales were calibrated before use (Cai *et al.*, 2004).

**Height (HT):** The height was measured using a meter while the TB patient was in the standing position with no shoes and was recorded to the nearest centimeter (diehl, 2003).

**Body Mass Index(BMI) :**

**Was calculated:**

$$\text{BMI} = \text{Wt}(\text{kg}) / (\text{Height meter})^2$$

The grades of obesity utilizing the BMI:

Underweight <20kg/m<sup>2</sup>

Desirable range of BMI(normal)20-<25kg/m<sup>2</sup>

Over weight =>25=30kg/m<sup>2</sup>.

Obesity =>30 kg/m<sup>2</sup>(diehl,1991).

**product analytical methods:**

**Sensory evaluation:** The bitterness value of all absinthes was defined by applying the procedure used in the European pharmacopoeia. In many researches the value of bitterness was handled as complementary of the dilution, which has already been tasted as bitter. That was defined by comparing it with quinine hydrochloride. In result of this comparison it was

found that the bitterness value was at 200,000. As it was set a taste panel, trained by five people. Furthermore the value of bitterness was calculated as average for all panel members. Additionally the taste panel qualitatively examined the absinthés to find the traditional wormwood aroma and the louche effect (Stalikas, 2007).

**Chemical analysis:** In particular and according to the mentioned standard levels, the final chemical analysis of ash, total crude and protein were done. Additionally, it was used a nitrogen to protein conversion factor of 6.25 per gram of sample to calculate the level of protein (Wursch *et al.*, 1984).

**Total phenol content:** TPC\_ Total phenol content in each extract was defined by using the FC with simple updates. In the first the freeze-dried extract was melted naturally in distilled water in a concentration of 50  $\mu\text{g/mL}$ . After that the calibration curve was done by gallic acid (0–60  $\mu\text{g/mL}$ ). The next step is putting the diluted extract or gallic acid (1.6 mL) 0.2 mL FC reagent (5-fold diluted with distilled water) and mixed thoroughly for a period of 3 minutes. In addition to that Sodium carbonate (0.2 mL, 10% w/v) was put to this mixture, which was left for 30 minutes at room with normal degrees of temperature. The next step was measuring the absorbance of the mixture at 760 nm using a UV–VIS spectrophotometer V-550 model (Jasco, Tokyo, Japan). Finally it was reported that TPC was milligram gallic acid equivalent per\_gram defatted L. aromatica (mg GAE/g DFLA) (McDonald *et al.*, 2001) .

**Total flavonoid content:** From another side the total flavonoid composition (TFC) of each extract was examined by using the aluminum chloride colorimetry way. To sum up, the extracted sample was lighter with methanol until 100  $\mu\text{g/mL}$ . Moreover the calibration curve was presented by a way of lightening quercetin in methanol (0–100  $\mu\text{g/mL}$ ). After that the diluted extract or quercetin (2.0 mL) was put with 0.1 mL of 10 % (w/v) aluminum chloride solution and 0.1 mL of 0.1 M potassium acetate solution. Then the mixture was necessary to keep it at normal temperature for half an hour. At the end became the measuring of the maximum absorbance of the

mixture, which found at 415 nm using a UV–VIS spectrophotometer. TFC was produced as milligram quercetin equivalent per gram defatted *L. aromatica* (mg QCE/g DFLA) (Chang *et al.*, 2002).

### ***Biological experiment***

**Patient feeding:** Tuberculosis patients were given three cups daily (200 ml) for three months of herbal mix or liquid mixture.

**Design of biological experiment:** All patients were assessed for nutritional status through physical measurements of weight and length clinical examination by doctors, tuberculosis analysis, hemoglobin and hemotocrit ratio. All patients were subjected to the hospital drug and hospital meal beside treatments. Patients were divided into four groups as follows:

- Group 1: Control included 15 patients.
- Group 2: included 15 patients fed on the herbal mixture.
- Group 3: included 15 patients fed on the liquid mixture.
- Group 4: included 15 patients fed on the herbal mixture in addition to the liquid mixture.

### ***Determination of blood constituents:***

**Sample collection:** Fasting morning venous blood samples (5ml) were withdrawn after a 12-14 hours overnight fasting from all subjects included in the study while they were in the supine position.

**Measurement of blood hemoglobin:** Blood hemoglobin (Hb%) was performed at central laboratory at Mansoura chest Hospital by using automated blood cell counter (Sysmex, Sysmex corporation Kobe, Japan ) to all patients as recommended by WHO (Bull *et al.*, 2000) .

**Measurement of blood hematocrit:** As known hematocrit (PCV) is the measure of the ratio's volume of the red blood cells, comparing to the volume of whole blood. The steps start taking the blood sample into a capillary and centrifugated. After that the ratio can be measured and represented as a decimal or percentage fraction (Bull *et al.*, 2000).



**Tuberculosis analyses:** It's known that the skin's tuberculin test, which is reported to discover latent Mycobacterium tuberculosis infection has its flaws. Lately a new diagnostic test for latent tuberculosis (Quanti FERON-TB [QTF-TB]) has been reported. This test is used for measuring the production of IFN- $\gamma$  in all blood, after stimulating using purified protein derivative (PPD). In fact the QTF-TB test addresses the operational mentioned flaws with the skin's tuberculin test. Although the test is based on PPD, it still has a low specificity in populations vaccinated with the Bacile Calmette-Guérin (BCG) vaccine. Furthermore, updated the test in order to include the antigens ESAT-6 and CFP-10, which are not found in BCG vaccine strains or the vast majority of nontuberculous mycobacteria. The final result proved that the majority of the patients were unvaccinated BCG, That led to compare the skin test and the novel blood test directly especially with people, whose skin test was not confounded by vaccination. Finally, a great agreement between the two tests was found (94%,  $\kappa$  value 0.866). The newer blood test was not influenced by the vaccination status of the subjects tested if it compared to the blood test based on PPD (Harboe, 1981).

**Statistical analyses:** Recent researches have reported that all analyses were done at least in triplicate. Then these values were presented as average values in parallel with their traditional derivations. By using the minitab software data were discussed. Furthermore it was held some statistical comparisons with one-way analysis of variance, and p values < 0.05 were regarded as great. In another hand the correlation coefficients (R) between TPC and TFC were calculated in order to define the connection between them (Stalikas, 2007).

### ***Results and discussion***

#### ***Sensory evaluation of herbal mix and liquid mixture:***

Data concerning the sensory evaluation, texture, odor, taste, color and overall acceptability of herbal mix and the liquid mixture was recorded in table (1). Results showed that herbal mix recorded  $6.8 \pm 0.33$ ,  $7.6 \pm 1.14$ ,  $7.4 \pm 1.16$ ,  $7.0 \pm 1.58$ , and  $8.2 \pm 0.83$  for texture, odor, taste, color and overall

acceptability, respectively. On the other hand, the liquid mixture recorded  $7.2 \pm 0.61$ ,  $6.8 \pm 0.43$ ,  $6.6 \pm 1.18$ ,  $7.6 \pm 1.11$  and  $7.6 \pm 0.54$ , respectively.

**Table (1): Sensory evaluation of herbal mix and liquid mixture.**

Parameters \ samples	Herbal Mix	Liquid mixture
Texture	$6.8 \pm 0.33$	$7.2 \pm 0.61$
Oder	$7.6 \pm 1.14$	$6.8 \pm 0.43$
Taste	$7.4 \pm 1.16$	$6.6 \pm 1.18$
Color	$7.0 \pm 1.58$	$7.6 \pm 1.11$
Overall acceptability	$8.2 \pm 0.83$	$7.6 \pm 0.54$

Each value in the table is the mean  $\pm$  standard deviation of three replicate.

It could be observed from these results that liquid mixture recorded the highest score in texture and color. Herbal mix recorded the highest score in oder, taste and overall acceptability. These results are in harmony with (Serhana *et al.*, 2010) who mentioned that goat’s milk is light, sweet, clean and has strong odour and fresh tasting. Peanut is good acceptability for the consumers in colour and flavor (Yanai *et al.*, 2015). Honeysuckle derives its name from the edible sweet nectar obtainable from its tubular flowers (Kula *et al.*, 2016). Juniper is normally fleshy, sweet and edible in the raw states (Mauseth, 2003). Echinacea colors that range from white, pink magenta and purple to yellow (Livesey *et al.*, 1998). Use of fenugreek, is limited by its bitter taste and strong flavor, abroad incorporating fenugreek using a proprietary process was tested for its taste acceptability and its effect on carbohydrate metabolism. It seedpods contain ten to twenty small, flat, yellow-brown, pungent and aromatic seeds (Gong *et al.*, 2016).

***Chemical composition of herbal mix and liquid mixture:***

Data concerning the chemical composition, moisture, total fat, protein, ash and fiber of herbal mix and liquid mixture was recorded in Table 2. Results showed that herbal mix recorded  $9 \pm 0.70$ ,  $9 \pm 0.70$ ,  $11.44 \pm 0.72$ ,  $6.33 \pm 0.67$  and  $19.62 \pm 1.19$  g/100g wet weight for moisture, total fat, protein, ash and fiber, respectively. On the other hand, liquid

mixture recorded  $7.04 \pm 0.66$ ,  $11.11 \pm 1.02$ ,  $8.36 \pm 0.70$ ,  $2.05 \pm 0.78$  and  $2.71 \pm 0.44$  g/100g weight for moisture, total fat, protein, ash and fiber, respectively.

**Table (2): Chemical composition of herbal mix and liquid mixture.**

Parameter \ Sample	Herbal mix	liquid mixture
Moisture (g/100g)	$9 \pm 0.70$	$7.04 \pm 0.66$
Total fat (g/100)	$9 \pm 0.70$	$11.11 \pm 1.02$
Protein(g/100g)	$11.44 \pm 0.72$	$8.36 \pm 0.70$
Ash (g/100)	$6.33 \pm 0.67$	$2.05 \pm 0.78$
Fiber (g/100)	$19.62 \pm 1.19$	$2.71 \pm 0.44$

Each value in the table is the mean  $\pm$  standard deviation of three replicate.

It could be observed from these results that herbal mix is richer in protein, ash and fiber than those of liquid mixture, however liquid mixture was higher in fat content than herbal mix. Results were in harmony with those obtained by **(Deineka et al., 2005)** who showed that honeysuckle contained 6% protein, 34% crude fiber, 8% crude ash, 11% moisture, 6% lipid and 3% fat. Horehound contain: 5% calories, 2% total carbohydrates, 4% fiber, 2% protein and 2% total carbohydrates **(Bokaeian et al., 2014)**. Echinacea contained 15% protein, 4% fat, 5.26% fiber, 3.12% ash and 72% carbohydrates **(Nusslein et al., 2000)**. Chemical composition of fenugreek: (28.55 % protein, 4.00% fat, 6.50% fiber, 3.20% ash, 4.00% moisture and 46.25% carbohydrates) **(Losso et al., 2009)**. Chemical composition and nutritive value of goat's milk constituents including 2.83, 3.06% fat and 3.28, 3.41% protein **(Marques et al., 2003)**. Honey is a sticky and viscous solution with a content of 80-85% carbohydrate (mainly glucose and fructose), 15-17% water, 0.1-0.4% protein and 0.2% ash **(Ajanaku, 2009)**. Peanuts contain high percentages of oil (45-54%) and protein (25-31%) **(Frankel, 2005)**.

**Total phenols and flavonoids of herbal mix:**

Data concerning the total phenols and flavonoids of herbal mix was recorded in Table 3. Results show that total phenols of herbal mix recorded  $13.62 \pm 0.96$  g/100g, while it recorded  $6.85 \pm 0.85$  g/100g for flavonoids.

**Table (3): Total phenols and flavonoids of herbal mix.**

Parameter	Herbal mix
Total phenols (g/100g)	$13.62 \pm 0.96$
Flavonoids (g/100g)	$6.85 \pm 0.85$

Each value in the table is the mean  $\pm$  standard deviation of three replicate

It could be observed be from these results that herbal mix is rich in phenols and flavonoids. Results were in harmony with those obtained by **(Deineka et al., 2005)** who showed that honeysuckle contained the presence of 5–12 phenolic compounds in relation to species, honeysuckle have a high content of anthocyanins  $1.40\text{mg}/100\text{g}$ , phenolic acids  $160\text{mg}/100\text{g}$  and flavonoids  $140\text{mg}/100\text{g}$ . The honeysuckle contain the phenolic fraction 0.40%, 0.9 % (flavonoids), and 0.7% (phenolic acids). **(Jeong et al., 2005)** Echinacea contains at least six distinct chemical constituents with pharmacologic activity (polysaccharides, flavonoids, chicoric acid glycosides, essential oils, polyacetylenes, and alkylamides) **(Kim et al., 2000)**.

**Weight and Body Mass Index:**

Regarding weight level; It could be noticed that weight level increased in the (TB) patient's blood (control group) after three months of feeding on the hospital diet side by side subject to treatment by (5kg) comparing to its level at the be ganing of hospitalization. Meanwhile, treated TB patients fed on the herbal mix in addition to the hospital diet caused increasing in weight level at the end of experiment period by (6.2 kg) as shown in group 2. In the same times feeding treated TB patients on liquid mixture in addition to the hospital diet increased the weight. level by (8.64 kg) as shown in group 3. Feeding treated TB patients on the hospital diet beside herbal mix side by side liquid mixture increased weight level to (8.74

kg) as recorded in group 4. An obvious elevating was observed in weight levels occurred by feeding treated TB patients on hospital diet beside herbal mix or liquid mixture especially, feeding on the twice together.

Regarding body mass index level; It could be noticed that BMI level increased in the TB patient's blood (control group) after three months of feeding on the hospital diet side by side subject to treatment by (2.92) comparing to its level at the beginning of hospitalization . Meanwhile, treated TB patients fed on the herbal mix in addition to the hospital diet caused increasing in BMI level at the end of experiment period by (3.81) as shown in group 2. In the same times feeding treated TB patients on liquid mixture in addition to the hospital diet increased BMI level by (6.12) as shown in group 3. Feeding treated TB patients on the herbal mix side by side liquid mixture increased BMI level to (6.86) as recorded in group 4. An obvious elevating was observed in weight levels occurred by feeding treated TB patients on hospital diet beside herbal mix or liquid mixture especially, feeding on the twice together.

**Table(4): Weight and Body Mass Index for studied subjects between groups.**

Parameters		Groups	G1-Control	Group (2)	Group (3)	Group (4)
			M ±SD	M ±SD	M ±SD	M ±SD
Weight(kg)	Zero time		60±1.02a	60.26±4.71a*	59.06±2.36a**	59.76±2.73a**
	(1) month		61.6±4.33b	62±1.73b*	64.6±3.27a*	64.83±5.82a*
	(2) month		63.2±6.11b	64±4.87b*	66.73±3.38a	66.4±3.66a
	(3) month		65±6.54b	66.46±5.07b*	67.7±6.26a**	68.5±5.63a**
Height(cm)			164.8±4.87a	164.2±1.74a	163.67±7.12b	165.07±7.8a
Body Mass Index(kg/m <sup>2</sup> )	Zero time		22.82±3.4a	22.76±3.31a	21.18±2.99b**	21.77±4.4a
	(1) month		23.45±3.52b	23.93±3.38b	24.37±3.09a*	25.17±4.45a
	(2) month		24.28±3.55b	24.53±4.03b	25.52±2.87a	25.97±4.16a*
	(3) month		25.74±3.56b	26.57±4.19b	27.3±2.95a	28.53±4.36a**

\*p<0.05significant \*\*p<0.01 high significant \*\*\*p<0.001 very high significant.

Mean values in each column having different superscript (a, b, c, d) are significant.

Finally, it could be observed from these results that TB patients who feed on the herbal mix and liquid mixture achieved the highest results in weight and BMI as shown in the fourth group. Meanwhile, weight levels of TB patients fed on the liquid mixture were higher than patients weight which fed on the herbal mix. Results were in harmony with those obtained by (Davis *et al.*, 2006). Fenogreek contains saponins, which help improve digestion and improve digestive enzymes. which promote weight gain (Hannan *et al.*, 2007). Fenogreek properties come from its ability to improve food absorption and increase appetite. In addition, gentian also promotes better gastric secretion and enzyme absorption (Grover *et al.*, 2002).

#### ***Hemoglobin and hematocrit:***

Regarding hemoglobin level; It could be noticed that hemoglobin level increased in the tuberculosis (TB) patients blood (control group) after three months of feeding on the hospital diet in addition to hospital treatment by (2.0g/dl) comparing to its level at the beginning of hospitalization. Meanwhile, treated TB patients fed on the herbal mix in addition to the hospital diet caused increasing in hemoglobin level at the end of experiment period by (2.3 g/dl) as shown in group 2. In the same time feeding treated TB patients on liquid mixture in addition to the hospital diet increased the hemoglobin level by (4.0 g/dl) as shown in group 3. Feeding treated TB patients on the herbal mix side by side to liquid mixture increased hemoglobin level to (4.1 g/dl) as recorded in group 4. An obvious elevating was observed in hemoglobin levels occurred by feeding treated TB patients on herbal mix or liquid mixture especially, feeding on the twice together.

Regarding hematocrit level; It could be noticed that hematocrit level increased in the TB patient's blood (control group) after three months of feeding on the hospital diet side by side subject to treatment by (5.26%) comparing to its level at the beginning of hospitalization as shown in the control group. Meanwhile, treated TB patients fed on the herbal mix in addition to the hospital diet caused increasing in hematocrit level at the end of experiment period by (4.91 %) as shown in group 2. In the same times

feeding treated TB patients on liquid mixture in addition to the hospital diet increased the hematocrit level by (7.04 %) as shown in group 3. Feeding treated TB patients on the herbal mix side by side to liquid mixture increased hematocrit level to (7.39 %) as recorded in group 4. An obvious elevating was observed in hematocrit levels occurred by feeding treated TB patients on herbal mix or liquid mixture especially, feeding on the twice together.

**Table (5): Hemoglobein and hematocrit levels in tuberculosis patient's blood:**

Parameter	Group	G1 (Control)	Group (2)	Group (3)	Group (3)
		M ±SD	M ±SD	M ±SD	M ±SD
Hemoglobein g/dl)(	Zero time	11.8±0.41a	12.4±0.5a***	12±0.1a*	12.3± 0.1a*
	(1) month	12.8±0.22b	13.33±0.48b**	14±0.1a***	14.5±0.1a***
	(2) month	13.6±0.51b	14±0.37b*	15±0.1a***	15.3±0.1a***
	(3) month	13.8±0.11b	14.7±0.01b	16±0.9a***	16.4±0.9a***
Hematocrit (%)	Zero time	36.54±0.1a	37.36 ± 0.45a**	37± 0.1a	37.24.± 0.1a
	(1) month	38 ±0.65b	39.87±0.83b	41 ±0.1a***	41.15±0.1a***
	(2) month	40±1.3b	41±0.92b**	43.±0.1a***	43.22±0.1a***
	(3) month	41.8±1.05b	42.27±0.88b	44.04±1.58a***	44.63±1.58a***

\*p<0.05significant \*\*p<0.01 high significant \*\*\*p<0.001 very high significant

Mean values in each column having different superscript (a, b, c, d) are significant.

Finally, it could be observed from these results that TB patients who feed on the herbal mix and liquid mixture achieved the highest results in hemoglobein and hematocrit as shown in the fourth group. Meanwhile, hemoglobein blood levels of TB patients fed on the liquid mixture were higher than patients hemoglobein which fed on the herbal mix. These results may be due to the high iron and minerals contents of liquid mixture and herbal mix components. The daily use of fenugreek seeds as dietary supplement has good beneficial effects to raise blood hemoglobin by easy means. This might further help to prevent and cure anemia and maintain good healthy life for longer duration (**Gong et al., 2016**). Honey is very

good for the entire body. It contains a good amount of iron. You will get about 0.42 mg of iron in 100 grams of honey, it contains copper and magnesium that will help in increasing the hemoglobin in your body (Ozer, 2000). Echinacea supplementation(1000 mg/d for 42 d) resulted in an increase in the number and size of red blood cells (RBCs), hemoglobin (Hb), and hematocrit (HCT) (Goel *et al.*, 2002). Goat's milk also had a greater iron bioavailability in anemic rats, anemic rats fed on goat's milk grew significantly better, had higher liver weights and hemoglobin regeneration efficiency (Cutic *et al.*, 2004).

\*Table (6): Tuberculosis bacteria level in patient's sputum samples:

groups \ time	Zero	(one month)	(two month)	(three month)
(g 1) Control	(+++)	(+++)	(++)	(+)
group 2	(+++)	(+)	(-)	(-)
group 3	(+++)	(++)	(+)	(-)
group 4	(+++)	(+)	(-)	(-)

***Analysis of the level of TB bacteria in spitting TB patients:***

At the beginning of hospitalization, no differences were noticed between all tuberculosis bacteria (TB) patients as all groups recorded (+++). After the first month, the laboratory tests confirmed that the number of TB still (+++) in the control group depending on the hospital drugs. In the same time, TB patients fed on the herbal mix as well as the hospital drugs (group 2) recorded a decrease in the TB level to (+) compared to its level at the beginning of hospitalization. In the same time, feeding TB patients on liquid mixture beside hospital drug (group 3) reduced the level of TB to level (++) . Meanwhile, feeding TB patients treated on the herbal mix and liquid mixture together beside the hospital drug (group 4) decreased the level of TB to (+).

After the second month, there was a decrease in the number of TB bacteria in the control group to (++) . Regarding tuberculosis bacteria in (group 2), feeding patients on herbal mix only or herbal mix and liquid



mixture together (group 4) beside hospital drugs, completely eliminated tuberculosis in patients. However, feeding TB patients on liquid mixture beside hospital drugs (group 4) decreased tuberculosis bacteria to (+) in comping with the control groups.

At the end of the experiment after the third month, laboratony tests confirmed that groups (2, 3 and 4) were completely eradicated tuberculosis bacteria causing the disease, while the control group was still suffering from the presence of bacteria causing tuberculosis. An obvious decrease in TB levels was observed by feeding TB patients on herb mix and liquid mixture together beside the hospital drugs.

Finnally, it could be observed from these results that patients suffening from TB and subjected to hospital drug side by side our treatmentas represented in groups 2, 3 and 4 achieved rapid healing comping to the control group which contain TB patients subjected to hospital drugs only.

Feeding TB patients beside hospital drugs on herbal mix and liquid mixture together, also feeding on herbal mix only achieved the highest results in tuberculosis bacteria elimination followed by TB patients group fed on liquid mixture only as compared to control group.

There are numerous pharmacological effects honeysuckle. It helped cure colds, fever, inflammation, swelling, boils, sores, and viral and bacterial infections. Today, this honeysuckle is a proven antibiotic. It is a broad spectrum antibiotic for bacteria such as staphylococcus aureus, mycobacterium tuberculosis. Most of these bacteria cause serious illness in humans that can result in death (**Jin et al., 2006**).

Horehound used for the treatment of inflammatory-related symptoms such as cold, fever, and sore throat. *M. vulgare* is also used for respiratory problems such as asthma and cough (**Yousefi et al., 2013**). The use of juniper has been approved for dyspepsia and, with other plants for bladder and kidney conditions. juniper has digestive, stomachic, and antirheumatic properties, because of these antiseptic properties investigate the antimicrobial activity of the essential juniper against some bacterial

(**Angionl et al., 2003**). Echinacea modulate immune system function to alleviate the severity and duration of colds and flu (**Perry et al., 2000**). The use of goat's milk substitute in human diets has been reported in much anecdotal literature about persons who suffer from eczema, asthma, chronic catarrh, migraine, colitis, hayfever, stomach ulcer, epigastric distress, and abdominal pain due to allergenicity of cow's milk protein (**Moreno et al., 2005**). Therapy honey used for wound healing, laxative action, cough and sore throat, topical antiseptis, prevention and treatment (**Asadi-Pooya, 2003**).

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## تقييم التأثير العلاجي لبعض الأعشاب والأطعمة على مرضى الدرن

إعداد

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### الملخص

أجريت هذه الدراسة لمعرفة مدى التأثير العلاجي لبعض الأطعمة والأعشاب على تحسين الحالة الصحية لمرضى الدرن. تم إجراء هذه الدراسة على ٦٠ مريض من المرضى المحجوزين بمستشفى الصدر بالمنصورة- محافظة الدقهلية من الجنسين ( ٤٨ ذكور، ١٢ إناث) تتراوح أعمارهم بين ١٨ - ٦٠ عام. تم إجراء بعض القياسات البيولوجية من وزن وطول وفحص سريري بمعرفة الأطباء كما تم إجراء بعض الإختبارات المعملية على عينات من دم المرضى للتعرف على نسبة الهيموجلوبين ونسبة الهيماتوكريت وعلى عينات للبصاق لتقدير مدى الإصابة بمرض الدرن. حيث تم تقسيم المرضى الى أربع مجموعات متساوية (١٥ مريض لكل مجموعة) على النحو التالي: المجموعة الأولى المجموعة الضابطة الموجبة تم تغذيتها على وجبة المستشفى فقط. المجموعة الثانية: تم تغذيتها على وجبة المستشفى بالإضافة الى مشروب خليط الأعشاب المكون من (عرعر - فرسيون - صريمة الجدى - رديكية) بنسبة اجم لكل عشب / ٢٠٠ مل ماء مغلى ٣ مرات يوميا. المجموعة الثالثة: تم تغذيتها على وجبة المستشفى بالإضافة الى مخلوط سائل مكون من مزيج من (لبن ماعز- عسل نحل - حلبة صفراء مطحونة- فول سودانى) ٣ مرات يوميا. المجموعة الرابعة: تم تغذيتها على خلطة الأعشاب جنباً الى جنب مع المخلوط السائل ٣ مرات يوميا. مع ملاحظة خضوع كل من المجموعات الأربع لعلاج المستشفى جنباً الى جنب مع المعاملات الغذائية على مدار فترة التجربة (ثلاثة شهور). خضعت كل من خلطة الأعشاب والمخلوط السائل للتقييم الحسى والتحليل الكيمياءى للتعرف على محتواها من البروتين والألياف والرطوبة والدهون والرماد. تم إجراء نفس الاختبارات السابقة من (وزن، طول، نسبة هيموجلوبين الدم، هيماتوكريت الدم، نسبة بكتيريا الدرن فى البصاق) على مدار فترة التجربة فى الشهر الأول والثانى وفي نهاية فترة التجربة أيضا (٣ شهور). وأظهرت خلطة الأعشاب أفضل النتائج فى القضاء على بكتيريا الدرن، فى حين سجل المخلوط السائل أفضل النتائج فى تحسين نسبة الهيموجلوبين و الهيماتوكريت وزيادة وزن مريض الدرن للمعدل الطبيعى. ووفقا للنتائج فإنه يمكن إستخدام خلطة الأعشاب والمخلوط السائل معا جنباً إلى جنب أدوية المستشفى لتحسين الحالة الصحية لمريض الدرن فى فترة زمنية وجيزة. وتوصى الدراسة: بإستخدام خلطة الأعشاب والمخلوط السائل معا جنباً إلى جنب أدوية المستشفى لتحسين الحالة الصحية لمريض الدرن فى وقت قصير.

الكلمات المفتاحية: الدرن، العرر، الفرسيون، الرديكية، لبن الماعز، الفول السودانى ، الحلبة، فحص البصاق، الهيموجلوبين، الهيماتوكريت، التأثير العلاجي.

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