

In vitro study for antiplatelet activity screening and thrombolytic activity of fermented arabica coffee ethanol extract

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BACKGROUND

Stroke is still a serious problem which has the highest rate of mortality in Indonesia. Abnormality of platelet aggregation causing the antiplatelet drugs become the main therapy for stroke. Aspirin as the anti-platelet drug has the limitation such as gastrointestinal toxicity and aspirin resistance. Thus, an alternative strategy should be explored.

Aims

To screen of antiplatelet activity and thrombolytic activity of fermented arabica coffee ethanol extract

Methods

Subjects: Human Platelet Rich Plasma (thrombolytic test) and Platelet Poor Plasma (blanko)

Divided into 6 groups, 6 replicates

Coffee Fermentation

- Dried coffee beans were put into 1 L sterile aquadest → autoclav 20 minutes, 121°C
- added with *Rhizopus oryzae* which was found in tempe yeast as much as 0.5 grams
- stored in an incubator at 30°C and 37°C for 4 days.

Extraction of Fermented Arabica Coffee

- Fermented Arabica Coffee was grounded into powder
- The extraction was carried out by using maceration process
- 500 g powder fermented arabica coffee was macerated by using 1 L 96% ethanol for 48 h
- Solvents were evaporated after filtering

Suspension of Fermented Arabica Coffee Extract

- Dissolved using 1% Tween 80
- Centrifuge
- various concentrations of 2.5%, 5%, 7.5% and 10%.

Measurement of Fermentation Characteristics

- pH measurement
- Caffein measurement
- Phenol measurement

Antiplatelet activity test

Thrombolytic activity test

Results

Table 1. Phytochemical Screening)

Phytochemical Screening	Fermented Arabica Coffee	Non Fermented Arabica coffee
Phenolic	0,6825%	0,824%
Caffein	1,283%	1,658%
pH	5,5	5,8

Table 2. Aggregation activity values

Groups	ADP Concentration (uM)	Aggregation values
controle (-) Aquades	10	62,6%
Controle (+) Aspilet	10	58,2%
Fermented Arabica Coffee Extract 2,5%	10	62,0%
Fermented Arabica Coffee Extract 5 %	10	37,9%
Fermented Arabica Coffe Extract 7.5%	10	9,8%
Fermented Arabica Coffe Extract 10%	10	3,1%

Table 3. The Results of thrombolytic activity test which was determined by calculating of lysis clots every 30 minutes

Groups	30 minutes (%)*	60 minutes (%)	90 minutes (%)*
Controle (-) Aquades	2.05 ^a ± 2,54	3,98 ^a ± 3,62	3,36 ^a ± 2,78
Controle (+) Aspilet	23.87 ^{bc} ± 3,27	17,55 ^{ab} ± 4,66	10,58 ^{bc} ± 3,57
Fermented Arabica Coffee Extract 2,5 %	18.81 ^b ± 4,14	11,93 ^{ab} ± 7,24	5,00 ^{ab} ± 2,68
Fermented Arabica Coffee Extract 5 %	21.17 ^{bc} ± 7,85	14,96 ^{cd} ± 8,48	6,99 ^{ab} ± 4,02
Fermented Arabica Coffee Extract 7.5 %	26.46 ^{cd} ± 5,12	18,04 ^{bc} ± 7,49	9,61 ^b ± 3,00
Fermented Arabica Coffee Extract 10 %	30.66 ^d ± 3,40	21,83 ^c ± 8,58	13,99 ^d ± 3,45

Conclusion

The fermented Arabica coffee ethanol extract has the potential as anti-platelet and thrombolytic activity (p<0,05).