POTENTIAL STUDY OF METHANOL EXTRACT OF *Cyperus kyllingia* AS GROWTH INHIBITOR *Colletotrichum* sp. CAUSES CHILI ANTHRACNOSE

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**Abstract** – According to Central Bureau of Statistics, the production of chilli in Lampung was decreasing for the last few years because of Chili anthracnose cause *Colletotrichum* sp. There are several ways to inhibit the growth of *Colletotrichum* sp. In fact, chemical pesticide is known not effective to inhibit *Colltetotrichum* growth. Based on those information, the experiment is done to know the effectively methanol extract of *Cyperus kyllingia* to inhibit *Colltetotrichum* growth. The experiment consists of several steps: (1) *Cyperus kyllingia* extraction, (2) To growth *Colletotrichum* sp on medium Potato Dextrose Agar enriched with extract *Cyperus kyllingia* for 10 days with concentration variable 0 (control), 100% (P1), 75% (P2), 50% (P3), 20% (P4) and 10% (P5), (3) The measured parameters are colony growth. Statistical analysis result indicates that methanol extract of *Cyperus kyllingia* significant inhibit the growth colony (P˂0.05). The control is not inhibiting the growth of *Colletotrichum* sp. in the medium non enrichment with methanol extract of *Cyperus kyllingia*.

Keywords: Anthracnose, Chili, *Cyperus kyllingia*.

**1.Introduction**

The red chili (*Capsicum annuum* L.) is a horticultural crop commodity that high economic value. Chili contain capsaicin which causes a spicy flavor that can be used as a kitchen spice. According to Prayudi (2010), chili also contain calories, protein, fat, carbohydrates, calcium, vitamin A, and vitamin B1. Based on the projection of the Central Bureau of Statistics (2016), the production of the national chili in 2014 reached 1,074,611 tons and decreased in 2015 with the national chili production to 1,045,200 tons. Various kinds of external factors cause the decrease of chili production, such as pests and plant pathogens.

One of the major diseases of chili is anthracnose. An anthracnose disease in chili plants can cause losses of between 20% and 50% (Rompas, 2001). The pathogenic attack that causes anthracnose disease is the fungus of the *Colletotrichum* genus. *Colletotrichum* cause anthracnose diseases, including *C. gloeosporioides, C. acutatum, C. dematium* and *C. capsici*. Over 90% of anthracnose diseases are caused by the fungus *C. capsici* (Gratitude *et al*., 2007). Figure 1 indicate Symptom of antharanose and *C. capsici*.

 

Figure 1. Symptom of antharanose and *C. capsici.*

In general, anthracnose disease occurs in chili that is old and mature. Synthetic fungicides is used to control anthracnose disease although the use of synthetic fungicides can cause environmental damage, can leave residues on the environment and on the chili fruit, can lead to resistance to pathogenic fungi, to the killing of natural enemies and non-target organisms. To minimalized the impact of synthetic fungicides, it has developed environmentally friendly control by using botanical pesticide.

The recommended disease control in the cultivation system is utilization botanical pesticide. *Cyperus kyllingia* is a weed which can be found in Indonesia. This weed grows in wide and dry area. *Cyperus kyllingia* is a weed that is wild plant which far from attention because it doesn’t have economical value. This plant commonly used as botanical pesticide because it has secondary metabolite which consist of saponin, tannin, flavonoid and gallic acid. The secondary metabolite can inhibit fungus such as *Colletotrichum* sp that causes anthracnose in red chili.

The negative impact for ecology and high cost of synthetic pesticide use, encourage farmers to find alternative control using materials that are cheap, safe and friendly environment.

Botanical pesticide based on plants (ex: *Cyperus kyllingia* the same genus with *Cyperus rotundus* but do not have rhizome) have many advantages compared with synthetic pesticides. Botanical ingredients abundant in nature, are easy to make, easy application by farmers and most importantly no negative impact for users, consumers and the environment.

**2. Research Methode**

Process of extraction *Cyperus kyllingia*

A small slice 500 g root of *Cyperus kyllingia* blend until smooth with the 1000 ml of 5 % methanol. Mix the mixture of the roots and methanol using a magnetic shaker for 24 hours. Then filter the liquid mixture with a glass funnel filtered paper. Then evaporate the solvent methanol in the liquid extract using a rotary evaporator at 50 ° C and low pressure 450-550 mmHg vacuum. There is also a way of evaporating naturally to obtain a dry material that turned out after weighed only weighing 2 mg (500 g stolen and root of *Cyperus kyllingia* mix with 1000 ml methanol and then evaporated by rotary evaporator. Product extraction 2 g extract like a gel).

Preparation of *Cyperus kyllingia* extract with water and detergent
Mix the mixture of the roots and water to erlenmeyer flask with 1000 ml water and detergent powder 1g / litre. Then immediately formulate this mixture into kaolin.

**3. Result**

 Figure 2 and 3 indicate the effects of *Cyperus kyllingia* Methanol Extract on

 in vitro inhibition to *C. capsici*

Days Incubation



Figure 3. The growth colony of *Colletotrichum* sp. on medium Potato Dextrose Agar

 enriched with extract *Cyperus kyllingia* for 4 days with concentration 0

 (control), ) and 50% .

**4. Conclusion**

The methanol extract of *Cyperus kyllingia* inhibit the growth colony *C. capsici* with various percentage significant (P˂0.05). The control is not inhibiting the growth of *Colletotrichum* sp in .the medium non enrichment with methanol extract of *Cyperus kyllingia*. Potential *Cyperus kyllingia* in WP formulation has phenolic active ingredients of gallic acid.

**REFERENCE**

Backman P.A & T.B.Brenneman. 1997. Stem rot. In Kokalis Burelle N,

 Porter D.M., Rodriguez Kabana, Smith D.H., Subharamanyam P. Compendium of

 Peanut Disease. St Paul: APS. p 36-37

 Hartman, G.L., J.B.Manandhar, & J.B.Sinclair. 1986. *Incidence of Colletotrichum*

 *spp. on soybeans and weeds in Illinois and pathogenicity of Colletotrichum*

 *truncatum*. Plant Disease 70:780-782

.

Raid, R.N.& Pennypacker,S.P. 1987. *Weeds as hosts for Colletotrichum coccodes.*

 Plant Disease 71:643-646.

Semangun, H. 1991. *Penyakit-Penyakit Tanaman Hortikultura Di Indonesia*. Gadjah

 Mada University Press : Yogyakarta.

 Sembodo, D.R.J. 2010. *Gulma dan Pengelolaannya*. Graha Ilmu : Yogyakarta.

Wanda T.S, Efri, Titik N.A., & HM. Akin. 2014. Uji Keefektifan Ekstrak Daun

 Jarak dan Daun Nimba terhadap Intensitas Penyakit Antraknosa pada Tanaman

 Cabai. Jurnal Agrotek Tropika Vol 2. No 3, September 2014.

Wati, I.F., Efri & Tri Maryono. Keefektifan Ekstrak Daun Sirih dan Daun Babadotan

 Mengendalikan Penyakit Antraknosa pada Buah Cabai. Jurnal Agrotek Tropika

 Vol 2. No.3, September 2014.

 Wulandari, A., J. Prasetyo, Efri, & Suskandini RD. 2014. Pengaruh *Trichoderma* spp

 terhadap penyakit Antraknosa pada tanaman cabai varietas Ferosa dan Laris.

 Jurnal Agrotek Tropika. Vol 2. No. 3, September 2014